TECHNICAL MANUAL

AVIATION-CREW SYSTEMS

OXYGEN SYSTEMS

(AIRCRAFT EQUIPMENT, MASKS, AND OTHER SYSTEMS)

N68936-04-D-0008

This change incorporates IRAC 2.

This manual update includes Basic, dated 1 April 2001 thru Change 5, dated 1 August 2004.

This manual supersedes the following NAVAIR manuals, 13-20FP-1, 13-20FP-2, 13-20FP-5, and 13-20FP-6.

Published by Direction of the Commander, Naval Air Systems Command

1 APRIL 2001

CHANGE 5 – 1 AUGUST 2004

LIST OF EFFECTIVE PAGES

Insert latest changed pages; dispose of superseded pages in accordance with applicable regulations.

NOTE: On a changed page, the portion of the text affected by the latest change is indicated by a vertical line, or other change symbol, in the outer margin of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to wiring diagrams are indicated by shaded areas.

Dates of issue for original and changed pages are:

Original	1 Apr 2001	Change 3	1 Jun 2003 (Incorp IRAC 1)	Change 5	1 Aug 2004 (Incorp IRAC 2)
Change 1	1 Nov 2001	Change 4	1 Jan 2004		
Change 2	1 Sep 2002				

Total number of pages in this manual is 308, consisting of the following:

Page No.	#Change No.	Page No.	#Change No.	Page No.	#Change No.
Title	5	4-10 — 4-25	4	10-8 — 10-17	0
A	5	4-26 Blank	4	10-18 Blank	0
i	5	5-1 — 5-3	0	11-1 — 11-26	2
ii	4	5-4	5	12-1 — 12-12	2
iii — iv	2	5-4A	5	12-12A	2
v — vi	3	5-4B Blank	5	12-12B Blank	2
viA	3	5-9	0	12-13	2
viB	4	5-10 Blank	0	12-14 Blank	2
vii — ix	4	6-1 — 6-13	0	13-1	4
x Blank	4	6-14 Blank	0	13-2 — 13-10	3
1-1 — 1-3	4	7-1 — 7-14	0	13-11	4
1-4 Blank	4	8-1	3	13-12 — 13-17	5
2-1 — 2-2	5	8-2 — 8-28	0	13-18 Blank	5
2-3 — 2-4	4	8-29	3	14-1	3
3-1 — 3-4	0	8-30 — 8-31	0	14-2	4
3-5 — 3-6	5	8-32 — 8-34	3	14-3 — 14-14	3
3-7 — 3-10	0	8A-1 — 8A-27	1	15-1 — 15-3	4
3-11	5	8A-28 Blank	1	15-4	5
3-12 — 3-15	3	9-1 — 9-8	2	15-5 — 15-12	4
3-16 — 3-17	0	9-9	5	Glossary-1	0
3-18 Blank	0	9-10 — 9-19	2	Glossary-2 — Glossary-3	4
4-1 — 4-2	0	9-20 Blank	2	Glossary-4 Blank	4
4-3	4	10-1 — 10-4	0	Index-1	5
4-4 — 4-6	0	10-5	2	Index-2 — Index-7	4
4-7	4	10-6	0	Index-8	3
4-8 — 4-9	0	10-7	5	Index-9 — Index-12	4

Major changes resulting from this change are as follows:

1. Incorporation of IRAC 2 (To disseminate new procedures for P-3 Pressure Reducer Assembly and High Pressure Oxygen Manifold Assembly.)
2. Incorporation of Aircraft Accident Report Inspection information.
3. Miscellaneous changes.

Zero in this column indicates an original page.

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont)

TABLE OF CONTENTS (Cont)

TABLE OF CONTENTS (Cont)

TABLE OF CONTENTS (Cont)

TABLE OF CONTENTS (Cont)

Chapter Page

TABLE OF CONTENTS (Cont)

TABLE OF CONTENTS (Cont)

LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS

LIST OF TABLES

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CHAPTER 1

INTRODUCTION

1-1. GENERAL.

WARNING

Unauthorized modifications to and deviations from prescribed life support and survival equipment by individual aircrewmembers could create unknown safety hazards. The OPNAVINST 3710.7 Series specifies minimum requirements for such equipment and is supplemented by the individual model NATOPS.

1-2. The OPNAVINST 4790.2 Series identifies NAVAIRSYSCOM as the only authority for modification to life support equipment and survival equipment, which is usually accomplished by the Fleet Support Team (FST) (formerly Cognizant Field Activity (CFA)) via Aircrew System Changes or a change to the equipment procurement package. This manual also permits operating activity with approval of the controlling custodian, to conditionally modify ONE unit of equipment in service to correct or overcome unsatisfactory conditions in that equipment item. Any other type of deviation, peculiar configuration, or modification to life support and survival equipment is not allowed, and Aircrew Survival Equipmentmen have no authority or responsibility to perform them.

1-3. If an omission or conflict should occur between FST documents and NATOPS requirements, if there is a need for clarification of equipment configuration, or if equipment deficiencies are discovered, the applicable FST should be notified. The FST for most of the life support and survival equipment is the Naval Air Warfare Center Aircraft Division (NAWCAD) Code 4.6.3.2, NAS Patuxent River, MD, 20670-1906. For parachutes and related hardware, including torso harnesses, the FST is the Naval Air Warfare Center Weapons Division, Code 463000D, China Lake, CA, 93555.

1-4. Naval Air Warfare Center, Indianapolis, Indiana has cognizance over all survival radios and emergency beacons.

1-5. This Aviation Crew Systems manual is released under the authority of the Naval Air Systems Command in compliance with the request of the Chief of Naval Operations. The instructions continued herein are mandatory. This manual consists of separately bound volumes as listed below:

Title	Publication Number
Inflatable Survival Equipment (Liferafts)	NAVAIR 13-1-6.1-1
Inflatable Survival Equipment (Life Preservers)	NAVAIR 13-1-6.1-2
Parachutes	NAVAIR 13-1-6.2
Seat Survival Kits (Oxygen Hoses and Non-SKU Seat Kits)	NAVAIR 13-1-6.3-1
Seat Survival Kits (SKU Series Seat Kits)	NAVAIR 13-1-6.3-2
Oxygen Equipment (Aircraft Equipment, Masks, and Other Systems)	NAVAIR 13-1-6.4-1
Oxygen Equipment (Regulators)	NAVAIR 13-1-6.4-2
Oxygen Equipment (Concentrators)	NAVAIR 13-1-6.4-3
Oxygen Equipment (Converters)	NAVAIR 13-1-6.4-4
Rescue and Survival Equipment	NAVAIR 13-1-6.5
Aircrew Personal Protective Equipment (Aircrew/Passenger Equipment)	NAVAIR 13-1-6.7-1
Aircrew Personal Protective Equipment (Clothing)	NAVAIR 13-1-6.7-2
Aircrew Personal Protective Equipment (Helmets and Masks)	NAVAIR 13-1-6.7-3
Aircrew Personal Protective Equipment (Protective Assembly, Aircrew Survival - Armor)	NAVAIR 13-1-6.7-4
Special Missions Aircrew Equipment	NAVAIR 13-1-6.10

1-6. The purpose of each volume is to provide technical information related to the configuration, application, function, operation, storage, and maintenance of a particular category of aircrew safety and survival equipment. The information contained in each volume is intended for Organizational, Intermediate, and Depot Levels of maintenance as established within the Naval Aviation Maintenance Program, OPNAVINST 4790.2 Series.

1-7. DESCRIPTION OF NAVAIR 13-1-6.4-1.

1-8. CONTENTS. This volume contains information and instructions pertaining to the configuration, function, application, operation, storage, and maintenance of oxygen equipment.

1-9. CONFLICTS AND SUPERSEDURE. This volume shall take precedence over all other documents except for effective Aircrew System Bulletins and Changes and Interim Aircrew System Bulletins and Changes. These documents are effective until officially rescinded, canceled, or superseded.

1-10. The Modification Section of each chapter lists all effective changes which affect oxygen equipment and have been issued on or before the date of latest change or revision to this volume. When applicable, the subject matter of these documents has been incorporated within the text of the appropriate chapters of this volume.

1-11. Effective changes and bulletins which affect oxygen equipment and are issued between changes or revisions to this volume should be recorded in the modification section of the manual for the affected equipment by annotating the outer margin of the page with a vertical line and the number of the change or bulletin. A copy of the change or bulletin should be filed in a separate binder in the ALSS work center. When this volume is updated these documents will be listed in the modification sections of the applicable chapters and the text of the chapters will be updated as required.

1-12. UPDATING. This volume will be updated periodically by the issuance of a Revision which is a 100% replacement of pages. Between revisions, changes and rapid action changes will be released, which are partial replacement of pages. All added and changed pages shall be incorporated in the volume according to page number. Superseded and deleted pages shall be discarded in accordance with local security procedures for data containing distribution statements. A list of effective pages is provided with each change. A summary of the major changed areas for a particular change is located directly beneath the list of effective pages.

1-13. COMMENTS AND RECOMMENDATIONS. Comments and recommendations shall be submitted in accordance with OPNAVINST 4790.2 Series.

1-14. ENGINEERING DRAWINGS. Government engineering drawings are available to the fleet by submitting a letter of request to Commanding Officer, Naval Air Technical Data and Engineering Service Command, Naval Air Station North Island, P.O. Box 357031, Building 90 Distribution, San Diego, CA 92135-7031. Each request should include the equipment nomenclature, part number, and CAGE code. The Drawings will be provided in the form of aperture cards (Automatic Data Processing Punch Cards). Technical data may also be obtained online at the NATEC website located at http://www.natec.navy.mil. Authorized users must first establish an account prior to obtaining data. Access/account information can be obtained at the NATEC website.

1-15. TECHNICAL DIRECTIVES AND FORMS. NATEC is the central management activity for aeronautical technical publications, engineering drawings and associated technical services. Upon release, NATEC will forward to all designated activities, copies of Technical Directives and Forms. Additional copies are available utilizing the procedures shown in paragraph 1-14 as well as from the PMA-202 website at https://pma202.navair.navy.mil.

1-16. SUPPLEMENTARY PUBLICATIONS.

1-17. In addition to Aircrew Systems Bulletins and Changes and Interim Aircrew Systems Bulletins and Changes still in effect, the following publications supplement this volume.

1. Naval Aviation Maintenance Program, OPNAVINST 4790.2 Series.

2. NAVAIR 00-35QH-2, Allowance List, Aviation Life Support System and Airborne Operation Equipment for Aircraft Squadrons Navy and Marine Corps.

3. Naval Logistical Library (NAVSUP 600), which lists directives and manuals available from the supply system.

4. The applicable Aircraft Maintenance Instruction Manuals, Planned Maintenance System Publications, NATOPS Flight Manuals, and Pilot's Handbooks.

5. OPNAVINST 4410.2A.

6. OPNAVINST 3710.7 Series provides general instructions on required minimums for aircrew personal protective equipment.

7. NAVFAC/DM-24. Naval Facilities Engineering Command design manual.

8. P2300. List of Repairable Assemblies and Applicability of Navy Aviation Materials.

9. P2310. List of Supporting Repair Parts of Navy Aviation Materials.

10. NAVSUPINST 4423.29 Series. Naval Material Command (NMC) Uniform Source, Maintenance and Recoverability (SM&R) Codes.

11. NAVAIR 13-1-6-8 Aviation Crew Systems Work Unit Code Manual.

12. NAVAIR 01-1A-509 Cleaning and Corrosion Control Organizational and Intermediate Maintenance.

13. NAVAIR 06-30-501 Technical Manual of Oxygen/Nitrogen Cryogenic Systems.

14. NAVSUPINST 4440.128 Compressed Gases and Gas Cylinders, Storage, Handling and Testing.

15. Ground Support Equipment. All Ground Support Equipment comments and recommendations shall be directed to the cognizant activities, Naval Air Engineering Center, Ground Support Equipment Dept., Lakehurst, NJ 08733.

16. NAVSUP P-719 is a Guide for the Assignment and Use of Source, Maintenance and Recoverability (SM&R) Codes.

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CHAPTER 2

MAINTENANCE CONCEPTS, SCHEDULING, AND DOCUMENTATION

Section 2-1. Maintenance Concepts

2-1. GENERAL.

2-2. NAVAL AVIATION MAINTENANCE PROGRAM. All maintenance and inspection actions upon Aviation Life Support Systems (ALSS) equipment shall be made as part of the Naval Aviation Maintenance Program in accordance with OPNAVINST 4790.2 Series.

2-3. LEVELS OF MAINTENANCE. Maintenance of ALSS equipment shall be performed at the established level of maintenance in accordance with OPNAVINST 4790.2 Series.

2-4. QUALIFIED PERSONNEL. Refer to OPNAVINST 4790.2 Series for qualifications of personnel authorized to perform maintenance actions on ALSS equipment.

Section 2-2. Maintenance Scheduling

2-5. GENERAL.

2-6. INSPECTION CYCLES. Scheduled maintenance requirements for aircraft and man-mounted equipment are published in the applicable aircraft maintenance requirement cards and this manual.

NOTE

To meet unusual situations and facilitate workload scheduling, refer to OPNAVINST 4790.2 Series for authorized deviations to scheduled phase inspection intervals.

Section 2-2A. Accident Evaluation

2-6A. AIRCRAFT ACCIDENT REPORT INSPECTION.

2-6B. Any Aviation Life Support System Equipment along with related subassemblies or equipment which have been recovered following use in an emergency ditching/bailout or ejection (refer to NAVAIR 13-1-6.2 for personnel and drogue parachutes) will be returned to the nearest Naval Supply Activity for shipment via traceable means to: Code 4.6.3.3, Naval Air Warfare Center Aircraft Division, Bldg 2187, 48110 Shaw Rd., Unit 5, Patuxent River, MD 20670-1906.

NOTE

Under no circumstances will any piece of Aviation Life Support System equipment which has been subjected to ditching/bailout or ejection be returned to service.

2-6C. Stencil outside of container in 1 inch letters as follows: THIS EQUIPMENT HAS BEEN USED IN AN EMERGENCY. These items of equipment are required for evaluation and determination of design deficiency and to establish requirements for product improvement.

Section 2-3. Maintenance Documents

2-7. GENERAL.

2-8. DOCUMENTING MAINTENANCE ACTIONS. Upon completion of any maintenance action (e.g., inspections, repairs, modifications), appropriate entries shall be made on applicable maintenance records, in accordance with OPNAVINST 4790.2 Series. The entries by the Aircrew Survival Equipmentperson shall provide a systematic record of equipment history and the documentation of all maintenance actions performed on the equipment.

2-9. MAINTENANCE DOCUMENTS. Refer to OPNAVINST 4790.2 Series for documents used to record history or to document maintenance actions or for additional information for completion of maintenance records. These records are designed to provide continuous configuration and inspection records throughout the service life of ALSS assemblies and their components.

Section 2-4. Illustrated Parts Breakdown Information

2-10. GENERAL.

2-11. This section explains the Illustrated Parts Breakdown (IPB) for ALSS equipment. The IPB can be found at the end of each chapter where applicable. The IPB should be used during maintenance when requisitioning and identifying parts.

2-12. SYMBOLS AND ABBREVIATIONS. Symbols and abbreviations used in the Illustrated Parts Breakdown are as follows:

Symbol	Definition
---*---	Closure (end) of attaching parts
#	Selected part, only one used
x	By (used in dimensions 12 in. x 6 in.)
&	And

Abbreviation	Definition
AR or A/R	As Required
CAGE	Commercial and Government Entity
COML	Commercially available
FIG, Fig	Figure
GAPL	Group Assembly Parts List
GFE	Government Furnished Equipment
IPB	Illustrated Parts Breakdown
L.H.	Left Hand
MAINT	Maintenance
NHA	Next Higher Assembly
No.	Number
RECOVER, RECY	Recoverability
REF	Reference
R.H.	Right Hand
SM&R	Source, Maintenance and Recoverability
Spec. Cont. Dwg. or SCD	Specification Control Drawing

2-13. GROUP ASSEMBLY PARTS LIST.

2-14. The Group Assembly Parts List (GAPL) contains illustrations and parts lists for each major assembly. These illustrations and accompanying lists show how the major assemblies are disassembled into subassemblies and detail parts. Each item illustrated is indexed for identification purposes. Each illustration is accompanied by a parts list providing a part number, description, and quantity for each item. The list is arranged in disassembly order. Through the use of a system of indentation, the relationship of the detail parts to the subassemblies and the relationship of the subassemblies to the main assembly, is shown.

2-15. FIGURE AND INDEX NUMBER COLUMN. The figure and index number of each item shown on the corresponding illustration appears in the Figure and Index Number Column, with the exception of assemblies and subassemblies which are not illustrated in assembled form. In these cases, the assemblies or subassemblies are listed but not indexed. The component parts thereof are both listed and indexed.

2-16. PART NUMBER COLUMN. This column contains the contractor's drawing number, government standard number, vendor drawing number or identifies the part as being commercial hardware (COML). Government standard parts are listed using the applicable MS, AN, AF, NAF, MIL, or JAN part number. Where the part number is controlled by a military specification, this specification number is listed in the Description Column.

2-17. DESCRIPTION COLUMN. This column lists the item name plus those modifiers necessary to identify the item. The description of a vendor-supplied item includes a five-digit number which identifies the manufacturer. This is the Commercial and Government Entity (CAGE) code. To correlate this CAGE code to the manufacturer's name, refer to the cataloging handbook H4/H8. CAGE codes may be omitted for prime manufacturer's parts and for government standard parts. When applicable, contractor's control drawing numbers and reference designations of electronic parts are also listed for general reference. When a separate exploded view is used to show the detail parts of an assembly or subassembly the Description Column contains an appropriate figure cross-reference in parenthesis following the description. This cross-reference appears both in the listing where the assembly is first described, and in the listing which the assembly is broken down. In the latter case, the abbreviation REF will appear in the Units Per Assembly column. Commercial hardware items (COML) are fully described so that they may be procured from normal commercial sources. Parts stocked in kits are identified with kit component code in this column, i.e., KD.

2-18. Indentation. The indentations headed “1” through “7” in the Description Column are provided to show the relationship of assemblies and their detail parts. The detail parts are indented one space to the right and listed below the assembly to which they belong. Determine the next higher assembly (NHA) of any detail part by locating, in the next space to the left (excluding attaching parts) the first item above the detailed part.

1 2 3 4 5 6 7

ARTICLE (or MAIN ASSEMBLY)
. Detailed parts for ARTICLE (or MAIN ASSEMBLY)
. ASSEMBLY
(ATTACHING PARTS)
. ATTACHING PARTS FOR ASSEMBLY
---*---
. . Detailed parts for ASSEMBLY
. . SUBASSEMBLY
(ATTACHING PARTS)
. . ATTACHING PARTS FOR SUBASSEMBLY
---*---
. . . Detailed parts for SUBASSEMBLY
. . . SUB-SUBASSEMBLY
(ATTACHING PARTS)
. . . ATTACHING PARTS FOR SUB-SUBASSEMBLY
---*---
. . . . Detailed parts for SUB-SUBASSEMBLY

2-19. Attaching Parts. Attaching parts are items used to attach parts or assemblies to each other and follow immediately after the part to be attached. The attaching parts have the same indentation as the part attached. The caption “(ATTACHING PARTS)” is placed on the line immediately above the listing of attaching parts. The separation symbol ---*--- appears on the line immediately under the last attaching part. Quantities of attaching parts are listed per unit. For example, if two fittings are required for each assembly and one bolt is required to attach each fitting, the correct listing would be:

. FITTING ASSEMBLY, Hinge 2
(ATTACHING PARTS)
. BOLT 1
---*---

2-20. UNITS PER ASSEMBLY COLUMN. This column shows the quantity of an item required in the next higher assembly. The abbreviation AR indicates when the quantity is “As Required”.

2-21. USABLE ON CODE COLUMN. Usable on codes are used to indicate part usage where various models and serial numbers of the equipment or similar parts within the equipment use different parts. A code is assigned to each variation of the equipment and entered into the GAPL when a part is used only in a specified variation. Where no code is entered, the part is used on all units covered by the GAPL or when no variations from the original equipment exist.

2-22. NUMERICAL INDEX.

2-23. The numerical index which follows each GAPL contains all the part numbers listed in that GAPL, arranged in alphabetical-numerical sequence.

2-24. PART NUMBER COLUMN. This column contains the part numbers of the parts and assemblies. Part number arrangement starts at the extreme left-hand position and continues left to right, one position at a time, according to the following order or precedence:

Space	(blank column)
Diagonal	(Slant)
Point	(period)
Dash	(hyphen)
Letters	A through Z
Numerals	0 through 9

NOTE

Spaces, diagonals, points, and dashes do not appear in the extreme left-hand position of the part numbers. However, they may be used in the second and succeeding positions and take precedence over letters and numbers as indicated above.

2-25. FIGURE AND INDEX NUMBER COLUMN. In this column, the digits preceding the dash refer to the figure in which the parts are illustrated. The digits following the dash are the index numbers.

2-26. SOURCE, MAINTENANCE AND RECOVERABILITY (SM&R) CODE COLUMN. The five digit SM&R codes, assigned by Naval Air Systems Command Representatives are reflected in the SM&R code column. The code format is composed of three parts consisting of a two-position Source Code, a two-position Maintenance Code and a one-position Recoverability Code. See table 2-1 for basic information.

NOTE

For more complete information on Uniform SM&R Codes, refer to NAVSUPINST 4423.29, OPNAVINST 4410.2A, and NAVSUP P-719.

Table 2-1. Source, Maintenance, and Recoverability (SM&R) Code Definitions

SOURCE			MAINTENANCE			
1st POS	2nd POSITION		3rd POSITION		4th POSITION	
MEANS OF ACQUIRING SUPPORT			USE: LOWEST LEVEL AUTHORIZED TO REMOVE/ REPLACE THE ITEM.		REPAIR: LOWEST LEVEL WITH CAPABILITY AND RESOURCES TO PERFORM COMPLETE REPAIR ACTION.	
P	A	ITEM: STOCKED	O	ORG/UNIT	O	ORG/UNIT
	B	ITEM: STOCKED, INSURANCE				
	C	ITEM: STOCKED, DETERIORATIVE				
	D	ITEM: SUPPORT, INITIAL ISSUE OF OUTFITTING & STOCK ONLY FOR ADDITIONAL INITIAL ISSUE	2 3 4 5 6	MINESWEEPER SUBMARINES AUX/AMPHIB DESTROYER, FFG CRUISER/CARRIER	2 3 4 5 6	MINESWEEPER SUBMARINES AUX/AMPHIB DESTROYER, FFG CRUISER/CARRIER
	E	EQUIPMENT: SUPPORT, STOCKED FOR INITIAL ISSUE OR OUTFITTING OF SPECIFIED MAINTENANCE ACTIVITIES				
	F	EQUIPMENT: SUPPORT, NONSTOCKED, CENTRALLY PROCURED ON DEMAND	F	I/AFLOAT	F	I/AFLOAT
	G	ITEM: STOCKED FOR SUSTAINED SUPPORT. UNECONOMICAL TO PRODUCE AT A LATER TIME				
	H	ITEM: STOCKED, CONTAINS HAZMAT. HMIS/MSDS REPORTING REQUIRED	G	ASHORE AND AFLOAT	G	ASHORE AND AFLOAT
	R	TERMINAL OR OBSOLETE, REPLACED				
	Z	TERMINAL OR OBSOLETE, NOT REPLACED				
K	D	ITEM: DEPOT O/H & MAINTENANCE KITS	H	I/ASHORE	H	I/ASHORE
	F	ITEM: MAINTENANCE KIT, PLACE AT O, F, H, L				
	B	ITEM: IN BOTH DEPOT REPAIR AND MAINT. KITS				
M	O	MFR OR FAB AT UNIT LEVEL				
	F	MFR OR FAB AT INTERMEDIATE/DS LEVEL	K	CONTRACTOR FACILITY	K	CONTRACTOR FACILITY
	H	MFR OR FAB AT INTERMEDIATE/GS LEVEL				
	L	MFR OR FAB AT SPECIALIZED REPAIR ACTIVITY (SRA)				
	G	MFR OR FAB AT ASSEMBLED AFLOAT OR ASHORE				
	D	MFR OR FAB AT DEPOT MAINTENANCE LEVEL	L	INTERMEDIATE SRA	L	INTERMEDIATE SRA
A	O	ITEM: ASSEMBLED AT ORG/UNIT				
	F	ITEM: ASSEMBLED AT INTERMEDIATE LEVEL - AFLOAT				
	H	ITEM: ASSEMBLED AT INTERMEDIATE LEVEL - ASHORE	D	DEPOT	D	DEPOT
	L	ITEM: ASSEMBLED AT SRA				
	G	ITEM: ASSEMBLED AFLOAT OR ASHORE				
	D	ITEM: ASSEMBLED AT DEPOT MAINTENANCE LEVEL				
X	A	ITEM: REQUISITION NEXT HIGHER ASSEMBLY			Z	NON-REPAIRABLE
	B	ITEM: NOT PROCURED OR STOCKED, AVAILABLE THRU SALVAGE, REQ. BY CAGE/PART NUMBER	Z	REF ONLY		
	C	INSTALLATION DRAWING, DIAGRAM, INSTRUCTION SHEET, IDENTIFY BY CAGE/PART NUMBER			B	RECONDITION
	D	NON-STOCKED, OBTAIN VIA LOCAL PURCHASE				

RECOVERABILITY		SERVICE OPTION CODE	
5th POSITION		6th POSITION	
DISPOSITION: WHEN UNSERVICEABLE OR UNECONOMICALLY REPAIRABLE, CONDEMN OR DISPOSE.		ASSIGNED TO SUPPORT ITEMS TO CONVEY SPECIFIC INFORMATION TO THE SERVICE'S LOGISTICS COMMUNITY/OPERATING FORCES.	
O	ORG/UNIT	1	I-LEVEL 1ST DEGREE
F	I/AFLOAT	2	I-LEVEL 2ND DEGREE
G	ASHORE AND AFLOAT	3	I-LEVEL 3RD DEGREE
H	I/ASHORE	6	COMMERCIAL ITEM, ORGANICALLY MFR'D
K	DLR; CONTRACTOR FACILITY	8	NON-CONSUMABLE; 2ND DEGREE ENGINE I-LEVEL
		9	NON-CONSUMABLE; 3RD DEGREE ENGINE I-LEVEL
L	INTERMEDIATE SRA LEVEL	E	END TO END TEST
		J	INTER-SERVICE DLR REPAIRABLE BELOW D-LEVEL
D	DLR; CONDEMN OR DISPOSE AT DEPOT	P	PROGRESSIVE MAINTENANCE
Z	NON-REPAIRABLE	R	GOLD DISC REPAIR
A	NON-REPAIRABLE BUT REQUIRES SPECIAL HANDLING	T	TRAINING DEVICES

CHAPTER 3

OXYGEN EQUIPMENT – GENERAL INFORMATION, SAFETY, AND HANDLING

Section 3-1. Aircraft Oxygen Systems

3-1. GENERAL.

3-2. Aircraft Liquid Oxygen and Gaseous Oxygen Systems provide the aircrewmember with diluted or 100% oxygen for breathing. The Liquid Oxygen System provides facilities to store and convert liquid oxygen (LOX) to gaseous oxygen and to deliver the gaseous oxygen at a breathable temperature and pressure to the aircrewmember. The Gaseous Oxygen System provides facilities to store gaseous oxygen in cylinders at either high or low pressure and to deliver it to the aircrewmember at a reduced pressure for breathing. This chapter also contains safety precautions pertinent to handling and storage of liquid and gaseous oxygen equipment.

3-3. AIRCRAFT OXYGEN SYSTEMS.

3-4. Aircraft Oxygen Systems installed in naval aircraft fall into one of the following categories:

1. Gaseous Oxygen Systems

   a. Low Pressure (0-500 psig)

   b. High Pressure (0-1800 psig)

   c. Reduced High Pressure

2. Liquid Oxygen Systems

3-5. GASEOUS OXYGEN SYSTEMS. Gaseous Oxygen Systems are used primarily in multiplace aircraft where space and weight considerations are less important items. Basically, all Gaseous Oxygen Systems consist of the following:

1. A cylinder (or cylinders) for storing the oxygen supply.

2. Tubing to distribute the oxygen from the main supply to the user(s).

3. Various valves for directing the oxygen through the proper tubing.

4. A regulator (or regulators) to control the flow of oxygen to each user.

5. A gage (or gages) to indicate oxygen pressure.

6. A mask (or masks) to direct the flow of oxygen to each user.

NOTE

The aircraft Illustrated Parts Breakdown (IPB) shall be consulted for usable items and system makeup.

3-6. LIQUID OXYGEN SYSTEMS. Liquid Oxygen Systems are generally used in aircraft where space and weight and mission considerations are paramount. The typical system consists of the following components:

1. A converter (or converters) for storing the liquid oxygen supply.

2. A filler valve for servicing the system.

3. A heat exchanger for warming the oxygen to normal breathing temperatures.

4. A control valve for maintaining desired system operating pressure.

5. A relief valve to relieve excess pressure.

6. Tubing to distribute oxygen to the user(s).

7. Regulator(s), quantity indicator(s), shutoff valve(s) and other essential cockpit (or cabin) equipment.

NOTE

The aircraft Illustrated Parts Breakdown (IPB) shall be consulted for specific items used and make-up of the system for specific aircraft.

3-7. OXYGEN BREATHING REGULATORS.

3-8. DILUTER DEMAND TYPE REGULATORS. Diluter Demand Regulators are currently installed in some naval aircraft. They are used with Gaseous Oxygen Systems. The Diluter Demand Regulator provides the aircrewmember with an air-oxygen mixture, or 100% oxygen, depending on mode of operation selected. By placing the diluter lever (or knob) in the NORMAL position, an air-oxygen mixture is supplied upon demand up to approximately 28,000 to 32,000 feet. The ratio of oxygen-to-air is automatically adjusted to supply increasing oxygen as altitude increases. At approximately 32,000 feet, ambient air is shut off, and the user receives 100% oxygen. By selecting 100% OXYGEN, the regulator supplies 100% oxygen at all altitudes.

3-9. AUTOMATIC POSITIVE PRESSURE DILUTER DEMAND TYPE REGULATORS. Several types of Automatic Positive Pressure Diluter Demand Regulators are currently installed in naval aircraft. These regulators are used with either Gaseous or Liquid Oxygen Systems. Operation of the Automatic Positive Pressure Diluter Demand Regulator at altitudes up to 28,000 to 32,000 feet is basically the same as the Diluter Demand Regulator. Above approximately 30,000 feet, added oxygen at a positive pressure is supplied to the mask. This added pressure increases with altitude. Service ceiling of these regulators is 50,000 feet, but due to human limitations, Automatic Positive Pressure Diluter Demand Regulators shall not be used above 43,000 feet except for very short periods.

3-10. MINIATURE OXYGEN BREATHING REGULATORS. Miniature Oxygen Regulators reduce and regulate supply pressure, and deliver 100% oxygen to the user at a breathable pressure. A safety pressure feature automatically maintains a positive pressure of 0 to 2.5 in H_2O in the mask at all altitudes up to, and including, 34,000 feet. The pressure breathing feature maintains a positive pressure in the mask of up to 20.0 in H_2O at altitudes between 35,000 and 50,000 feet. The positive pressure increases as altitude increases. Miniature Oxygen Regulators can be used routinely up to approximately 43,000 feet, but due to human limitations, Miniature Oxygen Regulators shall not be used above 43,000 feet except for very short periods.

3-11. DILUTER DEMAND TORSO-MOUNTED OXYGEN REGULATORS. These Diluter Demand Regulators are torso-mounted, multi-purpose regulators. They are designed to provide 100% oxygen or an air-oxygen mixture at the correct ratio and pressure to the aircrewmember, depending on altitude and mode selection. The regulators incorporate a selector knob (or lever) for selecting the 100% OXYGEN, or DILUTER mode.

3-12. CONTINUOUS FLOW REGULATORS. Continuous Flow Regulators are used in a limited number of naval aircraft. These regulators do not satisfactorily meet all the oxygen requirements of varying degrees of aircrew activity. Continuous Flow Regulators are not authorized for use by aircrewmembers, but are authorized for passenger use.

Section 3-2. Oxygen Hazards, Safety, and Handling

3-13. GENERAL.

3-14. Personnel safety cannot be guaranteed. However, a high level of safety can be achieved if operating personnel have the proper attitude, understanding, and training. Safety regulations must be conscientiously practiced and rigidly enforced. It is the painful truth that many of these rules have been written because of the death or suffering of those who did not know them or chose to ignore them. The best assurance of personnel safety lies in the safety-education of the people themselves. If they can be made aware of the potential hazards and the means of protecting their own lives, most of them will respond in a responsible fashion. Responsibility for the safety of one's self and others cannot, however, be obtained solely with a set of written regulations. Responsibility is secured on an individual basis, in varying degrees, and is the framework for all safety-education. There would be little need for safety rules if everyone were extremely responsible and knowledgeable. Unfortunately, this is not always the case. A lack of maturity on the part of an individual, or a new or unfamiliar job assignment, working a manner contrary to the possession of such responsibility and knowledge. Safety rules, then, become a primary tool in securing safety-conscious, well-trained personnel. In many instances, safety-education is conducted on a haphazard basis and only taken seriously when required by top management. It is not uncommon for safety procedures to evolve following a serious accident which has caused injury or death. The safety of personnel can be almost assured only when there is thorough understanding of potential hazards, correct procedures and equipment are used, and the equipment is kept in good working condition.

3-15. Safety precautions presented in this Section shall be followed by all personnel responsible for handling liquid and gaseous oxygen. To ensure personal safety and the safe and efficient handling of liquid and gaseous oxygen, all personnel shall be thoroughly familiar with the hazards involved. All operations involving the handling of LOX shall be performed by two or more qualified persons, except the removal and replacement of aircraft LOX converters. The filling of LOX converters removed from the aircraft shall require two qualified persons. (Refer to Glossary for definition of Qualified Personnel.)

WARNING

Use only small amounts of oxygen cleaning compound at a time. Use in a well ventilated open space. Avoid prolonged breathing. Oxygen cleaning compound vapors are hazardous and can cause death if too much is inhaled.

NOTE

Personnel servicing gaseous oxygen systems or LOX converters and operating ground support equipment servicing and transfer units shall be qualified and licensed in accordance with OPNAVINST 4790.2 series.

1. All AIMD oxygen shops, ashore and afloat, shall have oxygen monitors installed to ensure oxygen content in the space is maintained at a safe level (both physiological and over-enriched). Most shops have new oxygen monitor models. However, some AIMD oxygen shops may still have older oxygen monitors installed which can remain in service until receipt of the new monitor. Contact CFA at NAWCAD Lakehurst, NJ for appropriate monitor settings. Refer to NAVAIR 06-30-501 for currently authorized oxygen monitor model numbers.

2. Quality Assurance Division shall audit the oxygen shop to ensure step 1 is complied with.

3-16. SAFETY PRECAUTIONS; OXYGEN CLEANING COMPOUND MIL-C-81302.

3-17. Oxygen cleaning compound may dilute or displace oxygen below levels necessary to sustain life. Low levels are especially susceptible to oxygen displacement. The following warning shall be displayed wherever cleaning compound MIL-C-81302 is used.

WARNING

Inhaling trichlorotrifluoroethane vapor can be fatal.

Vapor concentration, immediately dangerous to life, is almost odorless, colorless, and tasteless. It may cause impairment of manual dexterity and vigilance. Breathing high concentrations may cause death or serious physical harm. In case of spill, warn other personnel and evacuate immediately.

3-18. The following precautions shall be followed by all personnel handling cleaning compound, MIL-C-81302.

1. Avoid breathing vapors. Avoid skin and eye contact.

2. Use the least amount possible to perform the task.

3. Assure good ventilation to maintain vapor levels at an acceptable level.

4. Do not wear contact lenses when using MIL-C-81302 cleaning compound.

5. Wear safety goggles for eye protection.

6. First Aid. If required, perform the following first aid procedures as necessary:

a. In case of direct contact, remove contaminated clothing and wash involved skin with soap and water. Seek medical attention if irritation occurs.

b. In case of eye contact, flush with potable water for at least 5 minutes. Call a physician.

c. If inside, remove to fresh air. If not breathing, give artificial respiration preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician. Do not give epinephrine or similar drugs.

d. If ingested, do not induce vomiting.

NOTE FOR PHYSICIAN:

Trichlorotrifluoroethane has caused cardiac sensitization to epinephrine in experimental animals (dogs). Cardiac arrhythmia, including ventricular fibrillation, could occur if epinephrine or one of its congeners is administered to patients exposed to high concentrations of trichlorotrifluoroethane. Medical use of epinephrine or any of its congeners is contraindicated except for patients with no arterial perfusion.

3-19. GASEOUS OXYGEN HAZARDS.

3-20. Gaseous oxygen is extremely hazardous when used in the presence of readily combustible materials. Do not permit oil, grease, gasoline, kerosene, aviation fuel or any other readily combustible material to come in contact with oxygen.

3-21. GENERAL SAFETY PRECAUTIONS (GASEOUS OXYGEN).

3-22. The following safety precautions shall be followed by all personnel handling gaseous oxygen:

1. Only oxygen conforming to MIL-O-27210, Type I shall be used in aircraft gaseous oxygen systems.

2. Exercise care that compressed oxygen does not become contaminated in anyway with hydrogen, hydrocarbon gases, or oil base liquids as a serious explosion can result.

3. Oil or grease must never be allowed to come into contact with or be used in the presence of open cylinders, valves, regulators, gages or fittings. Fire or explosion may result.

4. Never lubricate oxygen valves, regulators, gages, or fittings with oil or any substance except an approved oxygen compatible lubricant, listed below.

Mil Spec	Description	NIIN
TYPE III	Krytox	
TYPE III	Tribolube	16

Specific lubricants approved for use with oxygen equipment are listed in the appropriate chapter of this manual describing specific oxygen equipment.

NOTE

Krytox and Tribolube shall not be used on aluminum or magnesium fittings in applications where shear stress would be encountered.

MIL-T-27730 Teflon tape shall be used specifically as a thread sealant.

MIL-M-7866 Molybdenum Disulfide shall be used on stainless steel flared fittings and on those applications where Teflon Type MIL-T-27730 cannot be used.

5. Hands should be clean and free from oil before using oxygen equipment; do not wear greasy gloves or clothing.

6. A spark is not necessary to cause a fire or explosion. The chemical reaction of having fuel gases and oils combine with oxygen is sufficient to develop spontaneous combustion, and could cause a fire or explosion.

7. Never permit oxygen cylinders to come into contact with electrical welding circuits or apparatus.

8. Do not allow sparks or flames from welding or cutting torch or any other source to contact cylinders.

9. Never use oxygen from a cylinder without reducing the pressure through a pressure reducing regulator.

10. Never mix other gases or compressed air in an oxygen cylinder.

11. Never test for pipe line leaks or blow-out pipe lines with oxygen unless lines are specifically made and

cleaned for oxygen use. Use water-pumped nitrogen, which does not support combustion, for this purpose. Pipes, pipe threads, and other pressure containers are sometimes greased or oiled. Using compressed oxygen for the general purpose of testing for leaks is extremely dangerous and almost certain to cause a violent explosion.

12. To aid in preventing leakage or material failure due to overtorque of gaseous oxygen system tubing and fittings, strict adherence to torque values listed in table 3-1 is mandatory.

13. Do not confuse air with oxygen. Oxygen is one of several elements contained in air and should always be described by its proper name. Any attempt to use oxygen in place of compressed air may result in an accident. Never use oxygen for pneumatic tools, for starting diesel engines, as a pressure agent in oil reservoirs, for paint spraying, or for any use other than breathing, welding, or cutting.

14. Aviator's breathing oxygen supply cylinders can be readily identified by their green color and 3-inch wide white band around the upper circumference of the cylinder. OXYGEN, AVIATOR'S shall be stenciled in white parallel to the longitudinal axis and on diametrically opposed sides in letters 1 3/4 to 2 inches high.

15. Before connecting oxygen cylinders to oxygen systems, be sure that each cylinder is properly and correctly identified as containing aviator's breathing oxygen.

16. Never pressurize an oxygen system without the proper adapter and safety disc installed on the transfer line.

17. The amount of oxygen in a cylinder is determined by pressure.

18. Under no circumstances shall carbon tetrachloride or similar cleaning fluids be used. Minute quantities of these materials will contaminate the oxygen supply.

19. Do not clean any elastomer parts (rubberized) that have become contaminated with oil or grease. All such parts shall be replaced.

20. Prior to using leak detection compound (MIL-L-25567, Type 1), inspect carefully. Compound which is not clear and free from suspended material sediment is considered contaminated and shall be disposed of. Compound exhibiting peculiar odors such as acetone or alcohol is considered contaminated and shall be disposed of.

21. Use leak detection compound (MIL-L-25567, Type 1) sparingly as any solution entering oxygen equipment will contaminate the system. Remove all traces of the compound after test with a clean, damp, lint-free cloth.

22. The pressure in oxygen storage cylinders which service/replenish aircraft oxygen supply cylinders should not fall below 50 psig. Keep valve closed when not in use. Oxygen cylinders depleted to a pressure of approximately 50 psig shall be marked "EMPTY," tagged appropriately, and stored separately from charged oxygen cylinders. All cylinders which have a pressure below 15 psig shall be removed from service for vacuum and heat drying/hot nitrogen gas drying (MIL-STD-1411/MIL-STD-1359).

NOTE

A full oxygen cylinder is a cylinder which is charged to its rated pressure. With respect to a high pressure oxygen cylinder, 1800 psig is considered full.

To refill is to recharge a cylinder, regardless of the residual pressure remaining within the cylinder.

Cylinders that are less than 2 inches in outside diameter and less than 2 feet long do not require a hydrostatic retest.

Hydrostatic test interval for P-3 fixed installed oxygen cylinders (P/N 1084-514), shall not exceed eight years.

Low Pressure Oxygen Cylinders, Type MS21227-1 used on MA-1 Portable Emergency Oxygen System, do not have a Department of Transportation (D.O.T.) ICC number permanently stamped in the neck of the cylinder and therefore do not require hydrostatic testing. These cylinders are painted yellow in accordance with MIL-STD-101.

23. Never refill an oxygen cylinder that has gone beyond its hydrostatic test date (5 years after last test date stamped on cylinder shoulder). As long as the cylinder is full, it may remain in service.

24. Do not confuse aviator's breathing oxygen with welding or hospital oxygen. The latter types of oxygen usually have a moisture content that would freeze and plug the lines and valves of an aircraft oxygen system.

25. Leave cap on cylinder when not in use to protect valve. A broken valve may cause a cylinder to rocket like a torpedo, and could cause serious injury or death.

26. Before opening an oxygen cylinder valve, ensure cylinder is firmly supported. Cylinder valves are to be closed by hand only. If valve cannot be fully closed by hand, it shall be returned with cylinder for repair. A protective cap shall be installed on the valve of any cylinder not in use.

27. Open valves slowly, rapid surges in pressure can damage sensitive equipment and cause extreme temperature rise in small orifices and components.

28. Use existing or formulate charging stages when refilling oxygen cylinders and systems. Rapid pressurization creates heat which can result in fire or explosion.

WARNING

Wire-wrapped cylinders have wire-wrapping removed prior to hydrostatic testing; cylinders passing the hydrostatic test must be rewound prior to placing back in service.

NOTE

Not all cylinders require wire-wrapping. Wire wrapping is not required on 96 cubic inch cylinders manufactured under contracts N00363-78-M-7383 and N00383-77-C-2908.

29. Remove emergency oxygen cylinders or walk around bottles from aircraft for servicing.

30. Never fill aircraft systems without using a pressure reducing regulator. Aircraft have been demolished by failure to observe this precaution.

31. Ensure all oxygen equipment left outdoors is sheltered from the elements.

32. NAVSUPINST 4440.128 series contains instructions for storage, handling and hydrostatic testing intervals for compressed gases and gas cylinders.

3-23. LIQUID OXYGEN HAZARDS.

3-24. The potential hazards associated with the handling of liquid oxygen are due to its extremely cold temperature, rapid expansion upon conversion to gas at ambient (room) temperature, and its reactivity with any organic matter or flammable substance with which it comes in contact.

3-25. FREEZING. Because liquid oxygen has an extremely low temperature, it can freeze or seriously damage skin tissue upon contact. The effect is similar to frostbite or thermal burn. Use extreme caution when filling a warm container because vigorous boiling, splashing and evaporation will occur.

3-26. Metals and similar materials cooled by liquid oxygen may freeze to the skin upon contact. Flesh can be badly burned or torn in an attempt to free it. Always assume that frosted or uninsulated parts of liquid oxygen equipment are approximately -297°F (-182.7°C). Refer to Section 3-3 for protective clothing requirements.

3-27. FIRE AND EXPLOSION. Always handle liquid oxygen in well-ventilated areas. Never dispose of liquid oxygen in confined spaces. If liquid oxygen is spilled on a combustible substance, the substance will burn with great intensity if ignited.

3-28. Do not allow any organic matter or flammable substance to come in contact with liquid oxygen. Some of the materials that may react violently with oxygen under the right conditions of temperature and pressure are oil, grease, dirt containing oil or grease, tar, cotton, lamp black, coal dust, asphalt, gasoline, kerosene, JP fuel, propane, butane, naphtha, alcohol, ether, aniline, benzene, hydrogen, illuminating gas, acetylene, paint, sugar, sulfur, cloth and wood. If exposed to liquid oxygen, organic materials (such as those listed previously) will burn violently when ignited. All combustibles are potential explosion hazards when mixed with liquid oxygen. Mere mixture of liquid oxygen with powdered organic materials under certain conditions may cause explosion. If the vapor from liquid oxygen mixes with fuel vapor in the right proportions, the mixture will explode if ignited. Every fire involving liquid oxygen must therefore be regarded as an explosion hazard.

3-29. PRESSURE EXPLOSION. If liquid oxygen is vaporized and warmed to ambient temperature, one volume of liquid oxygen will expand to 862 volumes of gaseous oxygen. If this evaporation and expansion takes place in a confined space, explosive pressures in excess of 12,000 psig will be created. For this reason, all storage containers must be provided with pressure relief devices, unless the container is so vented that gas cannot be entrapped. All lines and equipment in which liquid may be trapped between closed valves must be equipped with pressure relief valves. All pressure relief valves and rupture discs must be placed and protected so that water cannot splash or condense upon them. Relief valves must be checked periodically to ensure that they are in proper operating condition.

3-30. GENERAL SAFETY PRECAUTIONS (LIQUID OXYGEN).

3-31. The following safety precautions shall be followed by all personnel handling liquid oxygen:

WARNING

Do not service LOX converters in an unsheltered area during inclement weather (rain, snow etc). Moisture can easily enter the vent port of the fill buildup vent valve and supply manifold. Moisture will freeze immediately upon contact with liquid oxygen rendering pressure closing or relief valve or both inoperative. This situation, if undetected, will lead to critical over pressurization and explosion of LOX converter:

LOX converters shall be drained in a well ventilated, clean area with limited access and protection from inclement weather so designated by type commanders or NAVSEA. A drip/drain pan with sides at least 6 inches high and free from dirt, grease, oil, fuel, hydraulic fluid, and other hydrocarbons, shall be used when draining LOX converters. Two qualified persons shall be present when draining LOX converters, one of which will be designated safety observer. A maximum of two LOX converters can be drained at one time.

1. Only liquid oxygen conforming to MIL-O-27210, Type II shall be used in aircraft liquid oxygen systems.

2. When transferring liquid oxygen or converting liquid oxygen to gaseous oxygen, the safety precautions pertaining to the handling of both liquid oxygen and gaseous oxygen apply.

3. Do not operate liquid oxygen equipment unless you are qualified or are working under the supervision of qualified personnel.

4. Wear goggles or a face shield when handling liquid oxygen.

5. Do not handle with bare hands any tubing or fittings through which liquid oxygen is flowing. Wear clean, dry gloves when handling parts of equipment cooled by liquid oxygen.

6. A rubber coated, cotton duck, impermeable apron shall be worn when working with liquid oxygen. The apron should be tied or secured in a fashion that would make it easy to remove in an emergency.

7. Cuffless coverall shall be worn. The coverall shall be worn over the gloves and the top of shoes, so that in the event of LOX spillage, the LOX will roll off the clothing and not become trapped in the gloves or boots.

8. Approved type liquid oxygen boots shall be worn.

9. In the event of accidental contact with liquid oxygen, quickly thaw the exposed area, preferably by immersion or by bathing area with large amounts of water. After the rapid thaw, wrap the exposed area loosely with clean dry dressing and report to a doctor immediately. Do not apply anything else to the affected area other than the clean dry dressing.

10. Do not permit smoking, open flames, or sparks in the liquid oxygen handling areas.

11. Do not carry matches in liquid oxygen handling areas.

12. Ensure all liquid oxygen equipment left outdoors is sheltered from the elements.

13. Keep work area and equipment free of oil, grease or any other combustible material.

14. Keep tools and clothing free of oil and grease.

15. Avoid spilling liquid oxygen on floor or deck areas. In case of accidental spillage, thoroughly ventilate the area.

16. Always call oxygen by its proper name. Do not confuse it with compressed air. Never use oxygen in place of compressed air for any purpose.

17. Handle converters, storage tanks and transfer hoses with care to avoid damage to the insulating space.

18. (Essex GCU-24/A Only) Prior to filling converter, inspect safety wire and Glyptal dots on relief valve and pressure closing valve for security.

19. When transferring liquid oxygen, do not leave valves open all the way. Open valves wide, and then immediately close them about one quarter turn; otherwise they may freeze in the open position.

20. Disconnect filling or transfer lines as soon as the transfer process is completed.

21. Do not leave liquid oxygen in a closed container, or trapped in a line between two valves; always open a valve on one end to avoid excessive pressure buildup.

22. Use only standard approved equipment in the handling and storage of liquid oxygen.

23. Do not introduce moisture into the system. Exercise care to ensure that no moisture is present on filler valve nozzles when they are connected or disconnected.

24. Purge piping and equipment with oil-free nitrogen, Type I, Class 1, Grade B, (Fed Spec BB-N-411).

25. To aid in preventing leakage or material failure due to over-torquing of liquid oxygen system tubing and fittings, strict adherence to torque values listed in table 3-1 is mandatory.

26. For additional precautions and information, refer to Technical Manual of Oxygen/Nitrogen Cryogenic Systems (NAVAIR 06-30-501).

3-32. (Converters Permanently Installed in Aircraft) Before recharging an aircraft liquid oxygen system with the converter installed, take the following precautions in addition to those already indicated. Ensure that:

1. The aircraft is in an open ventilated area.

2. The aircraft is not being fueled.

3. The aircraft is static grounded.

4. The aircraft electrical system is OFF.

5. No APUs or starting units are connected to the aircraft or are operating in the vicinity.

6. A CO_2 fire extinguisher is immediately available.

7. Personnel are kept clear of the aircraft overboard vent.

8. The deck under and in the immediate vicinity of the overboard vent is free from grease, oil, or any other combustible material.

9. A stainless steel, aluminum or copper drip pan is placed beneath the aircraft overboard vent.

3-33. (Converters Incorporating a Quick-Disconnect Mounting Plate) Converters shall be removed from aircraft prior to any servicing.

3-34. SAFETY PRECAUTIONS ABOARD SHIP. In addition to the general safety precautions, all personnel aboard ship shall follow these additional safety precautions:

Table 3-1. Torque Values for Tubing and Fittings

Torque Requirements for Flared Tube Connections (Aluminum)		
Tubing O.D. (inches)	Minimum Torque (pound-inches)	Maximum Torque (pound-inches)
5/16	100	125
3/8	200	250
1/2	300	400
Notes: Standard straight tapered pipe thread fittings have no torque values. Tape the pipe threads with two turns of teflon tape and install the fitting finger tight. Then attach wrench and tighten one to two turns maximum.		

WARNING

LOX converters shall be drained in a well ventilated, clean area with limited access and protection from inclement weather so designated by type commanders or NAVSEA. A drip/drain pan with sides at least 6 inches high and free from dirt, grease, oil, fuel, hydraulic fluid, and other hydrocarbons, shall be used when draining LOX converters. Two qualified persons shall be present when draining LOX converters, one of which will be designated safety observer. A maximum of two LOX converters can be drained at one time.

1. When smoking or when carrying an open or unshielded light or any potential spark-producing apparatus, do not enter an oxygen storage compartment. Do not approach any point where oxygen is being discharged or where there is a suspected leak in piping.

2. Exercise care in handling ammunition near oxygen.

3. Keep open flames at last 100 feet away from oxygen storage tanks or oxygen equipment.

4. Oxygen storage and handling compartments shall be sprayed with one coat of fire-resistant paint before being used. However, first remove any other existing paint from plant and equipment and thoroughly clean them to bare metal.

5. Do not permit painting when liquid oxygen is contained in the compartment.

6. During transfer operations, position the transfer trailer so that it will not shift with the pitch and roll of the ship. Lock the brakes and tie down the trailer.

7. Do not drain or vent oxygen in a closed compartment.

8. During transfer operations keep work area, equipment, tools, and clothing free from oil, grease of other hydrocarbon points.

9. Post LIQUID OXYGEN signs in a conspicuous place on all storage tanks, compartments, and handling rooms. Post CAUTION and NO SMOKING signs at entrances and hazardous points.

10. When liquid oxygen piping is not enclosed in a double wall or flame tight casing, post NO SMOKING signs in the compartments containing the piping.

3-35. STORAGE.

3-36. Liquid oxygen storage containers must be protected from excessive heat and direct rays of the sun. Liquid oxygen containers must be stored apart from containers of other gases or liquids and must not be stored within 50 feet of flammable material of any kind. Never transfer liquid oxygen in or around areas in which odors of any type may be absorbed by the liquid.

3-37. All storage containers must be provided with pressure-relief devices. These pressure-relief devices shall be checked periodically to ensure that they are in proper operating condition.

3-38. Oxygen must not be stored or used near flammable material or any substance likely to start or accelerate fire. Oxygen is not flammable, but supports combustion intensively. Store at least 50 feet from combustible materials.

3-39. Oxygen cylinders must not be stored with hydrogen or other combustible gas cylinders in an unventilated place. If stored inside, they shall be separated by a fire-resistant wall.

3-40. Do not store oxygen cylinders, LOX converters and apparatus under moving machinery, cranes, belts, or where exposed to residue from stack gasses. Oil and grease may drop and cause explosion, fire or contamination.

3-41. Gaseous and liquid oxygen servicing trailers can be stowed or parked inside enclosed buildings or hangars provided those spaces are constructed of concrete or steel and meet minimum ventilation requirements. Gaseous or liquid oxygen servicing trailers shall not be stowed or parked in enclosed wooden buildings. If approved stowage or parking facilities are not available, servicing trailers must be stowed or parked in a covered lean-to enclosed on three sides only. The lean-to should be positioned a minimum of 50 feet from traveled roadways, parking areas, and wooden structures.

3-42. LOX CONVERTER STORAGE. Liquid oxygen converters stored outdoors must be sheltered from the elements (e.g., direct rays of the sun, rain, snow, etc.), as moisture can easily enter vent or supply couplings. The moisture when frozen can render the presure closing valve or relief valve inoperative; this can lead to overpressurization and explosion of the LOX converter.

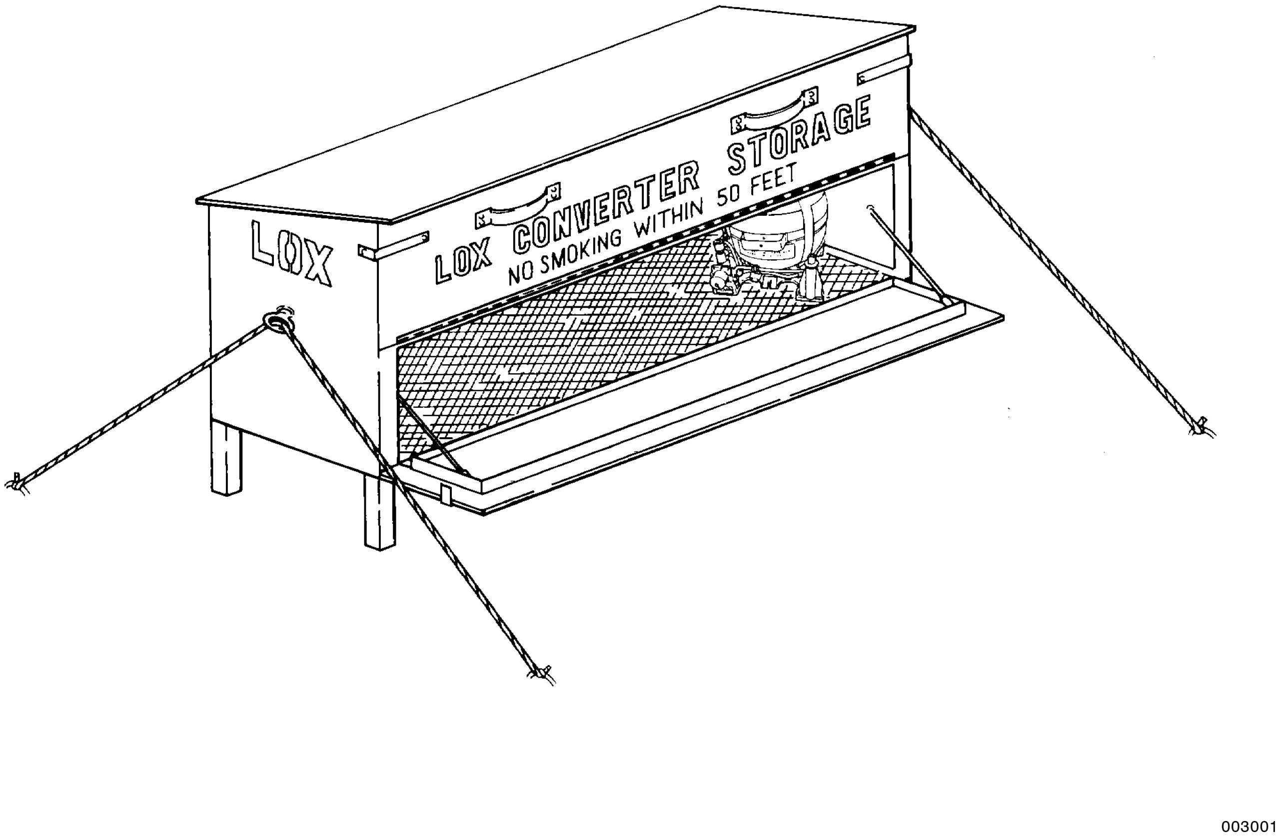

Figure 3-1. Liquid Oxygen converter Storage Shelter

3-43. Protective shelters shall be provided for LOX converters which are stored outdoors (figure 3-1). Protective shelters may be locally manufactured to suit individual activity requirements. Protective shelters shall be manufactured according to these requirements:

1. Shelters must be well ventilated to prevent the buildup of potentially dangerous concentrations of oxygen.

2. Shelters must be constructed of noncombustible materials.

3. All shelves must be constructed of expanded stainless steel wire mesh or other perforated material to provide adequate ventilation.

4. Shelves shall be no less than 17 inches high. The shelf depth shall be no less than 18 inches. The length shall be determined by the number of converters to be stored, leaving 18 inches or more for each converter. The bottom shelf must be a minimum of 10 inches above the ground.

5. Shelters shall be painted white and marked “LOX CONVERTER STORAGE” using green reflective tape L-S-300B. Letters shall be no less than 4 inches high. In addition the warning “NO SMOKING WITHIN 50 FEET” shall be marked on the shelter using red reflective tape L-S-300B. Letters shall be no less than 2 inches high.

6. The shelter shall be provided with eyebolts or handles to provide a four-point tiedown.

Section 3-3. Protective Clothing

3-44. GENERAL.

3-45. Because of the hazards associated with handling liquid oxygen, it is imperative that all personnel working with liquid oxygen wear protective clothing.

3-46. The following is a list of approved protective clothing and authorized allowance that can be used when working with liquid oxygen:

Support Equipment Required

Quantity	Description	Reference Number
1 ea per individual	Apron, Impermeable, Cotton Duck, Rubber Coated	MIL-A-41829 (CAGE 81349) NIIN 00-082-6108
1 ea per individual	Face Shield, Industrial, Style B	L-F-36 (CAGE 81348) NIIN 00-202-9473
2 ea per individual	Coveralls, Explosive Handlers	MIL-C-14610 (CAGE 81349)
	X Small (32-34)	NIIN 00-279-2455
	Small (36-38)	NIIN 00-279-8719
	Medium (40-42)	NIIN 00-279-8720
	Large (44-46)	NIIN 00-279-8721
	X Large (48-50)	NIIN 00-279-8722
1 ea per individual	Shoe, Molders	MIL-S-82245 (CAGE 81349)
	7D	NIIN 00-926-9965
	7EE	NIIN 00-926-9966
	8D	NIIN 00-926-9967
	8EE	NIIN 00-926-9968
	9D	NIIN 00-926-9969
	9EE	NIIN 00-926-9970
	10D	NIIN 00-926-9971
	10EE	NIIN 00-926-9972
	11D	NIIN 00-926-9973
	11EE	NIIN 00-926-9974

Support Equipment Required (Cont)

Quantity	Description	Reference Number
1 pr per individual	Gloves, LOX Servicing (Note 1)	(CAGE 65370)
	Medium	LOX-MIL-M
	Large	LOX-MIL-L
	X-Large	LOX-MIL-XL

Notes: 1. LOX Servicing Gloves are not currently stocked in the Navy Supply System and must be ordered Open Purchased from the following vendor:
Tempshield Inc.
23 Industrial Way
Trenton Business Park
Trenton, Maine 04605
TEL: (800) 680-2796

1. Face Shield/Safety Goggles. Eye protection shall be worn at all times when working with liquid oxygen. When working in confined areas or overhead, wear face shield or safety goggles to protect the eyes. Safety glasses with side shields may also be used.

2. Always wear LOX servicing gloves when handling any equipment that is or may have been in recent contact with liquid oxygen. Gloves shall be loose fitting so that they can be quickly removed if LOX gets into them. In addition use protective gloves when handling purging units.

3. Coverall, explosive ordnance handlers, cotton sateen, fire resistant shall be used by liquid oxygen handlers. Cuffless sleeves and trouser legs shall be worn over the top of gloves and shoes.

4. Apron, impermeable, cotton duck, rubber coated, shall be worn when working with liquid oxygen. The apron shall be tied or secured in a fashion that would make it easy to remove in case of an emergency.

5. Shoes, LOX boots (shoes, safety, molders, congress style, black) a type that can be easily removed, shall be worn when working with liquid oxygen.

6. Clothing that is splashed by liquid oxygen shall be removed immediately and thoroughly aired for at least 1 hour.

Section 3-4. Aircraft Oxygen System Requirements

3-47. GENERAL.

3-48. Aircraft oxygen systems shall be purged when the system is left open to the atmosphere, when empty, or whenever contamination is suspected.

3-49. When maintenance action involves the removal and reinstallation of connecting hardware without a change in adjustment or alignment to the system, a thorough ground functional check shall be conducted prior to the aircraft being released for flight. (Refer to OPNAVINST 4790.2 series.)

WARNING

Only clean plastic caps or plugs (MIL-C-5501) shall be used to close oxygen system openings. Under no circumstances will tape, rags, or paper be used to close openings created by removal of components.

3-50. When an aircraft oxygen system is opened for the removal/replacement of any component, all openings created shall be immediately plugged or capped to prevent entrance of moisture or contaminants.

3-51. PURGING OXYGEN SYSTEMS.

3-52. The following Materials Required, Support Equipment and procedures shall be followed when purging oxygen systems:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Gas/LOX Purging Unit, Model A/M26M-3	3447AS100-1

3-53. PURGING LOW-PRESSURE OXYGEN SYSTEMS. Low-pressure gaseous oxygen systems shall be purged by one of the following methods:

1. Aircraft having filler and distribution lines connected to the same end of the cylinder shall be purged by charging the system with gaseous oxygen; then by depleting. Perform this procedure a minimum of three times.

WARNING

Use only oil-free nitrogen, Type I, Class 1, Grade B for purging oxygen systems. The use of aircraft nitrogen servicing trailers for purging oxygen systems is strictly prohibited. For oxygen test stands and purging equipment, use only nitrogen from gray cylinders marked NITROGEN OIL FREE in white letters. Two 3-inch wide black bands mark the tops of these cylinders.

2. Aircraft having the filler valve connected to one end of the cylinder and distribution lines to the opposite end (i.e., continuous flow system) shall be purged as follows:

a. Connect purging unit (P/N 3447AS100-1) to aircraft filler valve.

b. Disconnect regulator distribution line(s) at regulator(s) to permit a flow.

c. Pass heated oil-free nitrogen through system at maximum pressure of 120 psig and a minimum temperature of 90°F for 30 minutes. Create a flow through the system. This can be accomplished by various methods, depending on the type of aircraft system. Consult the applicable aircraft MIM for detailed instructions. If moisture or contaminants are still present, repeat purge as required.

d. Disconnect purging unit. Reconnect regulator(s) and recharge system with oxygen.

e. Drain system through regulator(s) to remove any residual nitrogen.

f. To complete purge, recharge system with oxygen.

3-54. PURGING HIGH-PRESSURE OXYGEN SYSTEMS. Two factors must be considered when purging high-pressure oxygen systems: purging for the removal of contamination or purging for the removal of moisture.

3-55. To purge a high-pressure oxygen system of contamination, proceed as follows:

NOTE

It can never by certain that moisture is not present. Therefore, the following purge procedures should only be used in emergency situations where the procedures outlined in paragraph 3-56 can not be accomplished.

1. Charge system with gaseous oxygen; then drain system through regulator(s).

2. Repeat step 1 a minimum of two times.

3. To complete purge, recharge system with oxygen.

3-56. To purge a high-pressure oxygen system of moisture, proceed as follows:

WARNING

Cylinders which have been open to the atmosphere and voided of oxygen (to less than 15 psig) shall be removed from service for vacuum and heat drying/hot nitrogen gas drying (MIL-STD-1411 and MIL-STD-1359A) before recharging.

Use only oil-free nitrogen, Type I, Class 1, Grade B (Fed Spec BB-N-411) for purging oxygen systems. The use of aircraft nitrogen servicing trailers for purging oxygen systems is strictly prohibited. For oxygen test stands and purging equipment, use only nitrogen from gray cylinders marked NITROGEN OIL FREE in white letters. Two 3-inch wide black bands mark the tops of these cylinders.

1. (Manually Operated Cylinder Valve) Close cylinder valve; disconnect supply line at cylinder.

2. (Automatic Opening Cylinder Valve) Disconnect supply line at cylinder.

3. Disconnect regulator distribution line(s) at regulator(s) to permit a flow.

4. Connect purging unit (P/N 3447AS100-1) to aircraft filler valve and pass a flow of heated oil-free nitrogen (Fed Spec BB-N-411) through system at maximum pressure of 120 psig and a minimum temperature of 90 °F for 30 minutes. Create a flow through the system. This can be accomplished by various methods, depending on the type of aircraft system. Consult applicable aircraft MIM for detailed instructions. If moisture or contaminants are still present, repeat purge as required.

5. When purging is completed, disconnect purging unit, reconnect all lines, and open cylinder valve (if applicable).

6. Functionally test system in accordance with applicable Maintenance Instruction Manuals (MIMs).

3-57. PURGING AIRCRAFT LIQUID OXYGEN SYSTEMS. To purge aircraft liquid oxygen systems, proceed as follows:

WARNING

Use only oil-free nitrogen, Type I, Class 1, Grade B (Fed Spec BB-N-411) for purging oxygen systems. The use of aircraft nitrogen servicing trailers for purging oxygen systems is strictly prohibited. For oxygen test stands and purging equipment, use only nitrogen from gray cylinders marked NITROGEN OIL FREE in white letters. Two 3-inch wide black bands mark the tops of these cylinders.

1. Disconnect and, if necessary, remove LOX converter.

2. Connect purging unit (P/N 3447AS100-1) to aircraft system supply quick-disconnect.

3. Create a flow at user end of system. This can be accomplished by various methods, depending on type of aircraft system. Consult applicable MIM for detailed instructions.

4. Pass heated oil-free nitrogen (Fed Spec BB-N-411) through system at maximum pressure of 120 psig and a minimum temperature of 90°F for 30 minutes. If contaminants are still present, repeat purge as required.

5. When purging is completed, disconnect purge unit. Reconnect aircraft system supply quick-disconnect to LOX converter.

6. Fill aircraft system if applicable. Functionally test system in accordance with applicable MIM.

3-58. LOX CONVERTER MAINTENANCE.

3-59. QUICK-DISCONNECT CONVERTERS. A Calendar Inspection, consisting of a Visual Inspection followed by a Bench Test, shall be performed on all LOX converters incorporating a quick-disconnect mounting plate prior to being placed in service, and at intervals not exceeding 231 days thereafter. The Calendar Inspection shall be performed in accordance with the chapter in this manual, or the technical manual pertaining to the specific type and part number LOX converter to be serviced. These converters shall be removed from aircraft prior to servicing.

3-60. PERMANENTLY INSTALLED CONVERTERS. A Calendar Inspection shall be performed on all permanently installed LOX converters in accordance with the technical manual pertaining to the specific type and part number LOX converter to be serviced. These converters shall undergo bench testing during the Standard Depot Level Maintenance (SDLM) of the aircraft in which it is installed.

3-61. PURGING LOX CONVERTERS. LOX converters shall be purged when they have been emptied, or whenever moisture or contamination is suspected. Purging shall also be performed upon completion of any maintenance action which causes the system to be open to the atmosphere. In no case shall purge interval exceed 231 days. Purging of LOX converters shall be performed in accordance with the applicable chapter of this manual. To purge LOX converters not included in this manual, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter Assembly	59A120-D5-46
1	Gas/LOX Purging Unit, Model A/M26M-3	3447AS100-1

WARNING

Liquid oxygen converters shall be emptied of LOX and allowed to warm to ambient temperature prior to purging.

1. Connect purging unit to vent port of fill, buildup, and vent valve.

2. Attach adapter assembly to fill port of fill, buildup, and vent valve. Turn knurl knob clockwise until it seats and then back out counterclockwise two complete turns.

3. Attach converter drain line to converter supply quick-disconnect coupling.

NOTE

For ARO Corporation converter P/N 21170-10/-13 remove relief valve tubing and cap the two fittings that tubing was removed from.

4. Pass heated oil-free nitrogen through the converter at a pressure of 120 psig and a minimum discharge temperature of 90°F. Duration of purge is dependent on converter type. Purge duration is as follows:

NOTE

For converters that indicate internal probe shortage it may be necessary to purge the converter for a longer period of time.

a. Essex Industries Inc. converters P/N 10C-0016-10A and 10C-0016-16 and Bendix Corporation P/N 29073-D2, 3263004-0201, and 3263006-0101 which are at ambient temperature shall be purged for a period of 30 minutes.

b. ARO Corporation converters P/N 21170-10/-13 which are at ambient temperature shall be purged for a period of 60 minutes.

5. When purging is completed, disconnect purging unit and bench test the converter.

Section 3-5. Oxygen System Components Maintenance Shop

3-62. GENERAL.

3-63. During the evolution of cleanliness requirements for oxygen systems, additional requirements have been generated. This has occurred partly because applications vary in scope from industrial use with the least stringent requirements, to manned space vehicles with the most demanding requirements. The major difference between aerospace cleanliness and industrial cleanliness is that the former eliminates airborne contaminants. Therefore, the aerospace industry requires particle count, white rooms and deionized water. These tiny particles are not considered significant contaminants by the oxygen industry. The exclusion of airborne particles is an extremely costly process requiring pressurized rooms, expensive filtration equipment and elaborate procedures. The AIMD/depot level cleanliness standards need not be of clean room quality, but an enclosed, air-conditioned clean area, segregated from contaminant-producing operations shall be considered adequate.

3-64. Shore-based operational facilities shop design criteria are presented is the Naval Facilities Engineering Command Design Manual (NAVFAC DM-24). Deviations from NAVFAC DM-24 shall not be made without prior approval of Naval Facilities Engineering Command Headquarters (NAVFAC HQ). See figure 3-2 for typical shore-based facility.

3-65. The climate control system must be able to maintain a temperature of 65° to 75°F. Oxygen facilities without LOX generating equipment may be heated by unit heaters (steam), or direct-fuel heaters employing an air distribution duct system, providing the heating unit is not located in the transfer shop. Oxygen facilities with Lox generating equipment may be heated by a central heating plant, or by electric heat. Open-fired heaters shall not be used.

3-66. VENTILATION.

3-67. All air supplied to a shop where gaseous or liquid oxygen/nitrogen is transferred from one unit to another shall be exhausted directly to the atmosphere. Under no circumstance shall the exhaust air be returned to the oxygen/nitrogen transfer area.

3-68. Ventilation shall be provided in LOX converter and oxygen components shop, to prevent accumulation of potentially dangerous concentrations of oxygen or nitrogen. Mechanical exhaust fans capable of providing a minimum of 3 air changes per hour shall be used as a positive means of exhausting the air. Although oxygen is about 10 percent denser than air, it is not necessary to evacuate the air near the floor because oxygen rapidly diffuses into air.

3-69. Ventilation requirements for oxygen shops aboard ship that support OBOGS systems only, require only 2.0 air changes per hour. However those spaces must meet required safety standards when working with hazardous materials such as oxygen cleaning compound (MIL-C-81302), toluene, acetone and other materials associated with the repair and cleaning of OBOGS components.

3-70. ELECTRICAL.

3-71. All electrical wiring and electrical equipment shall be in accordance with NAVFAC Specification 9Y (latest revision). The following information has been extracted from this specification:

1. Rigid conduit shall be used in wiring installations.

2. Electrical receptacles on the outside of buildings shall be weatherproof, 250V ac, 20 ampere (minimum), 3-wire grounding-type, and shall be furnished with plugs. Receptacles shall be connected to 220V ac, single phase service.

3. Lighting fixtures may be standard type, except that where exposed to mechanical damage, a suitable guard or cover shall be provided.

4. Switches and motor starting shall be enclosed and of the general use type.

5. Motors shall be of a type that do not have arcing or contact making parts. Three-phase motors of squirrel cage type shall be used wherever possible.

6. All equipment shall be static-grounded.

7. Transformer banks shall be located a minimum of 50 feet from transfer shop or LOX storage tank areas.

3-72. INTERIOR FINISHING AND FIXTURES.

3-73. FLOORS. In shops where gaseous oxygen transfer operations are conducted, a concrete floor or vinyl-type floor covering is considered adequate. In shops where LOX transfer operations are conducted, the floor shall be concrete. Non-glazed, or rough-glazed ceramic tile is also a suitable floor finish.

3-74. WALLS. The walls shall be finished with a smooth, impact-resistant, non-chipping, non-flaking material.

3-75. CEILINGS. The ceilings shall be easily cleanable, non-dust accumulating acoustical-type material.

3-76. WORK BENCHES, TABLES AND STORAGE BINS. Work benches and table tops shall be of seamless, non-porous material free of hydrocarbon finishes. Color shall be in contrast to walls and ceilings to minimize eye fatigue. Storage bins shall not contain more than the required parts to maintain an orderly production rate. Work benches, tables and storage bins shall be maintained free of grease, oil and other combustible materials.

3-77. TOOLS.

3-78. All tools and equipment shall be maintained free of grease, oil and other combustible materials. Tools used on oxygen equipment shall not be used for any other purpose. Tools shall be marked OXYGEN USE ONLY, or other suitable methods of identification may be used.

3-79. WORK AREA CLEANLINESS.

3-80. Work areas shall be kept clean at all times. Dust and dirt removal shall be accomplished by a vacuum system at any time that dust is evident at any location in the work area. Damp mopping will be used to follow up the vacuum cleaning for dirt and dust removal. Heel and chair marks or other discolorations of the floors shall be removed by scrubbing. All spare parts shall be removed from the work benches or covered with a lint free covering at the end of the last work shift each day. Work benches and test equipment will be wiped clean prior to the start of each work day. Smoking, refreshments, or lunch containers of any kind shall not be permitted in the work area. Only ball type pens are permitted for use in the shop (no lead or erasures).

3-81. PERSONAL CLEANLINESS.

3-82. Solvent contact with the skin should be avoided where possible. Finger nail polish shall be removed prior to entering shop. Cosmetics and medication which may produce contamination shall not be worn by any personnel. In particular, eye makeup, rouge, face powder and hair spray shall be avoided. Under no conditions will makeup be applied in the shop area. Personnel with skin and/or upper respiratory diseases shall not be allowed to work in the overhaul shop area. Personnel with colds, temporary coughing, sneezing and severe sunburn shall be assigned temporary jobs outside the shop until they are sufficiently recovered.

3-83. QUALITY ASSURANCE.

3-84. Long, trouble-free service can only be expected when cleanliness in the shop is maintained. Frequent Quality Assurance inspections are required to ensure proficiency in work performed by shop personnel, and that cleanliness is maintained.

3-85. TRAINING.

3-86. Shop supervisors shall be responsible for conducting a continuing training program stressing the significance of oxygen system cleanliness, personal cleanliness and the oxygen safety program. Conscientious adherence to all cleanliness requirements and safety regulations shall be observed at all times.

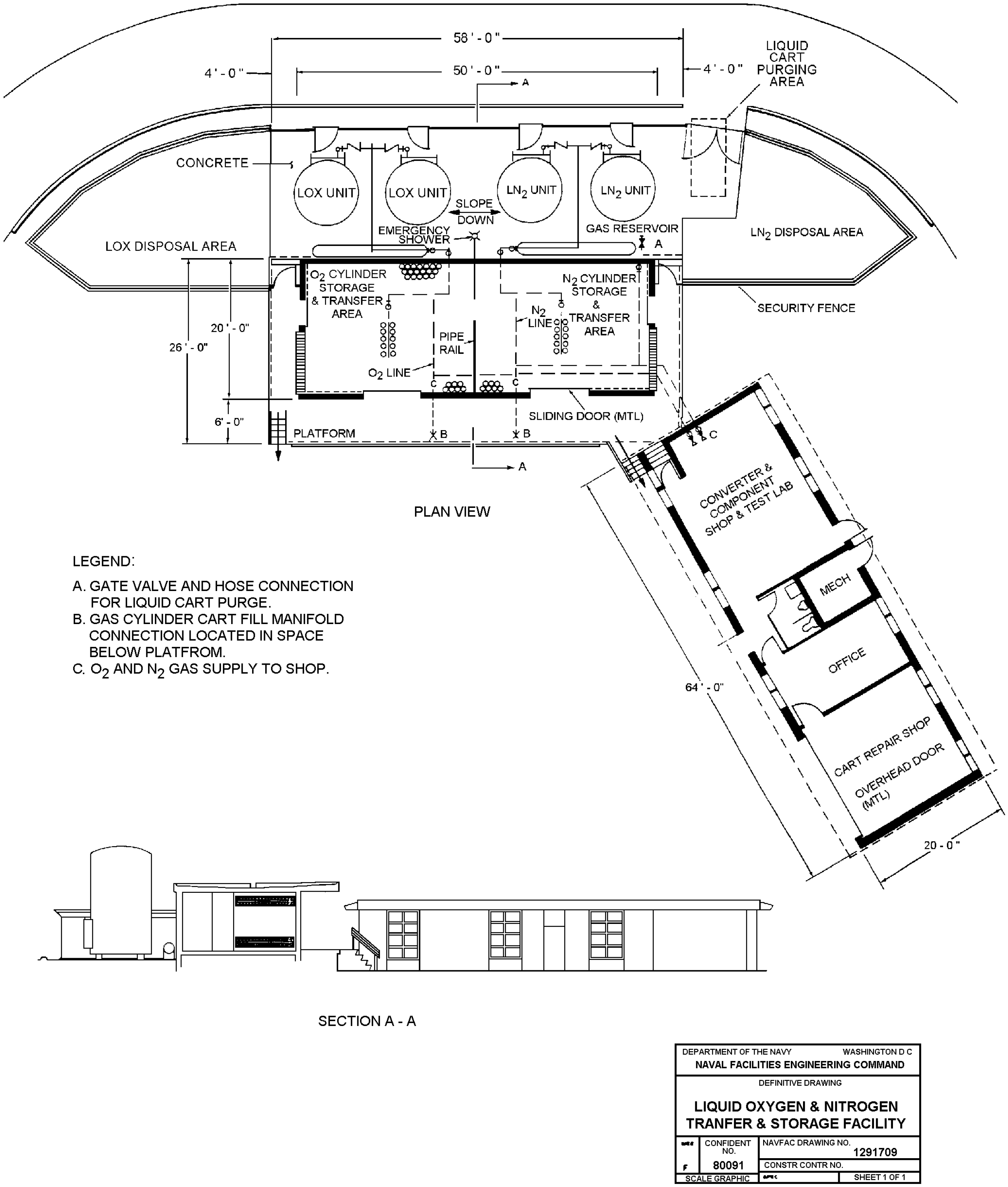

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Figure 3-2. Typical Oxygen Transfer and Components Maintenance Facility

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CHAPTER 4

OXYGEN COMPONENT CLEANING

Section 4-1. Description

4-1. GENERAL.

4-2. Cleaning of oxygen components shall be accomplished using procedural steps outlined in this chapter.

4-3. Two ultrasonic tanks manufactured by CAE Blackstone (figure 4-1) will be utilized in the following procedures. For leading particulars for the HT-1206 Ultrasonic Navy Oxygen Cleaning System, see table 4-1.

4-4. CONFIGURATION.

4-5. The HT-1206 Ultrasonic Navy Oxygen Cleaning System consists of the following components:

NOTE

All technical component terminology for the Ultrasonic Navy Oxygen Cleaning System is referenced to figure 4-1 unless otherwise noted.

1. Heated Ultrasonic Tank (1)

2. Parts Basket (2)

3. Stainless Steel Lid (3)

4. Tank (RED) ON/OFF Switch (4). For the temperature controller.

5. Temperature Control Knob (5). For adjusting the temperature from a range of 32°F to 212°F (0°C to 100°C.)

6. Generator (GREEN) ON/OFF Switch (6). For turning the ultrasonic mechanism on.

7. Fuse Receptacle (7)

8. Electrical Receptacle (8). The unit operates using 110/115 volt 60 Hz power. See figure 4-2 for wiring diagram of the ultrasonic tank.

9. Stainless Steel Drainage Valve (9)

Table 4-1. Leading Particulars

Voltage	120V 60 Hz
Fuse	8 Amp
Operating Frequency	40 kHz
Temperature Range	32°F to 212°F (0°C to 100°C)
Capacity	1.9 Gallons
Mounting	Free Standing
Exterior Dimensions	20 x 13 x 14 inches
Interior Working Dimensions (Without Basket)	11 1/2 x 5 3/4 x 7 1/2 inches
Interior Working Dimensions (With Basket)	9 1/2 x 3 3/4 x 3 3/4 inches
Weight	41 1/2 lb

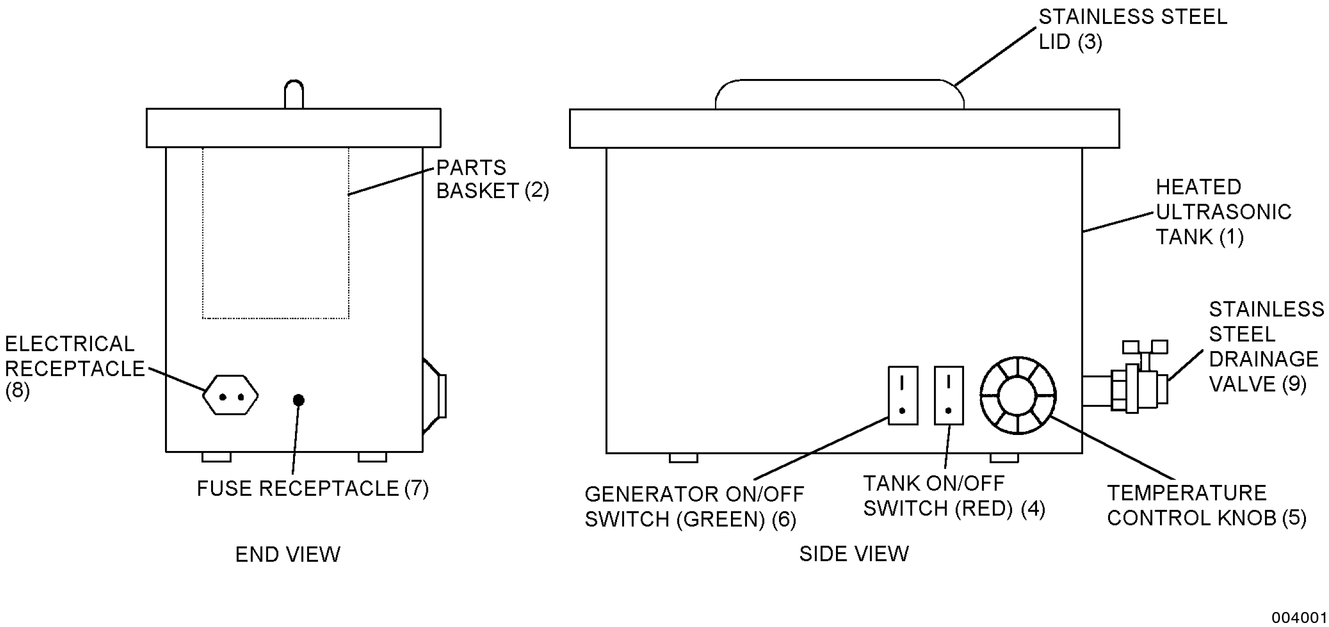

Figure 4-1. HT-1206 Ultrasonic Navy Oxygen Cleaning System

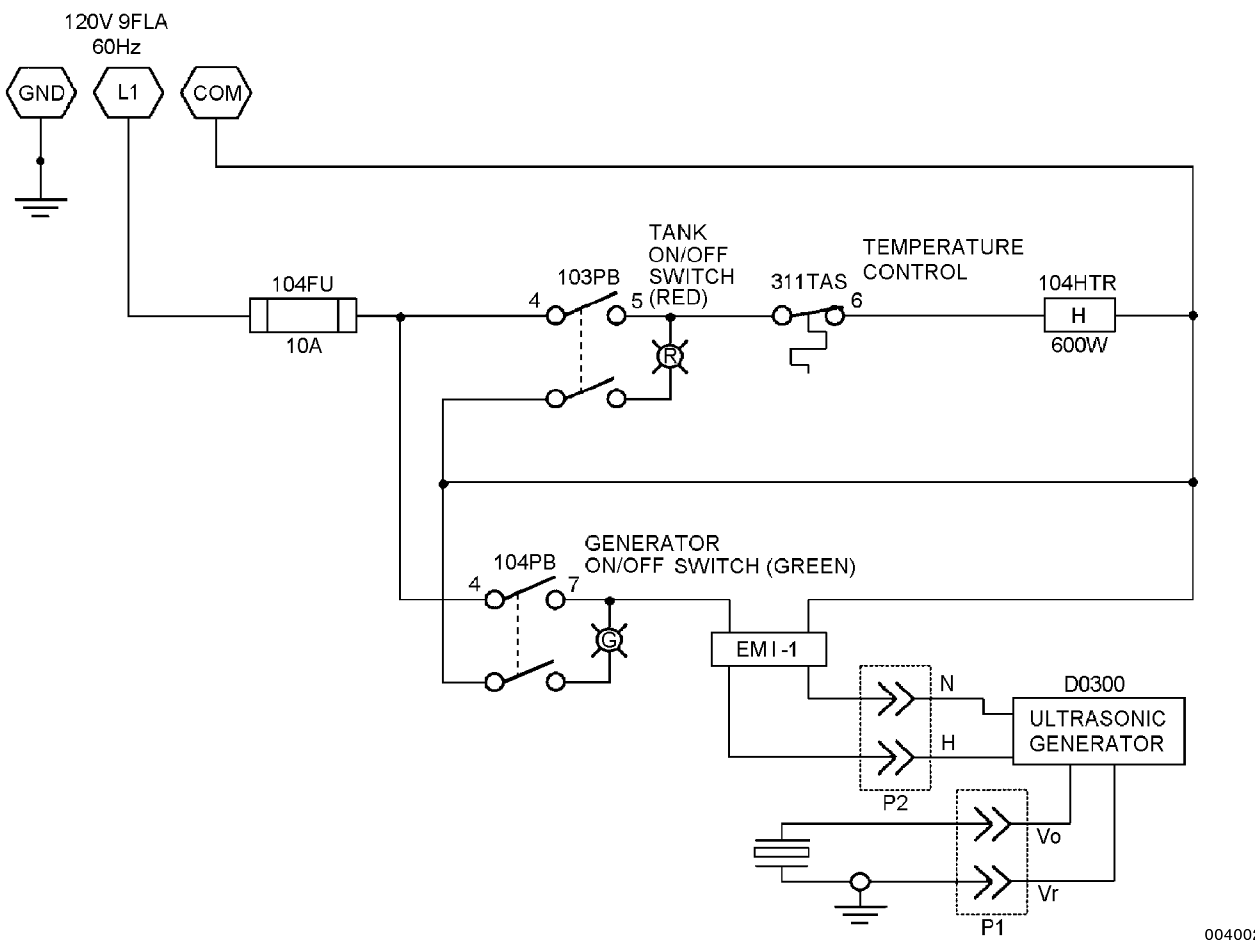

Figure 4-2. Wiring Diagram - Ultrasonic Navy Oxygen Cleaning System

Section 4-2. Modifications

4-5A. GENERAL.

4-5B. The 1.9 Gallon Ultrasonic tanks shall be modified in accordance with Support Equipment Change No. 5583.

Section 4-3. Maintenance

4-6. GENERAL.

4-7. This section contains procedural steps for the ultrasonic tank prior to the cleaning process. All work shall be performed in a clean and dust free area.

NOTE

Upon completion of any maintenance action (e.g. inspection, repair, modification), make necessary entries on appropriate form in accordance with OPNAVINST 4790.2 series.

Navy Oxygen Cleaner (NOC) and distilled water used in the cleaning process will be disposed of in accordance with federal, state and local instructions governing hazardous waste. An empty 5 gallon Navy Oxygen Cleaner container can be utilized to drain ultrasonic tanks and containers as required if authorized by local hazardous waste facility.

4-8. INSPECTION.

4-9. ACCEPTANCE INSPECTION. The Acceptance Inspection consists of a Visual Inspection followed by a Heater Test. The Heater Test shall be performed on the ultrasonic tank upon issue. Maintenance, troubleshooting and repair shall be done in accordance with the applicable technical manual.

4-10. Visual Inspection. To perform the Visual Inspection, proceed as follows:

1. Inspect the ultrasonic tanks for exterior damage.

2. Ensure power on/off switches and heat control knob are in working condition.

3. Ensure basket and lids are not damaged and fit correctly.

4. Ensure drain valve can be opened and closed.

5. Ensure power cord is in good working condition.

4-11. Ultrasonic Tank Heater Test. The Heater Test is required upon receipt of the ultrasonic tank and after any maintenance repair action is performed on the ultrasonic tank in accordance with the applicable technical manual. To perform the heater test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Distilled Water	NIIN 00-356-4936

Support Equipment Required

Quantity	Description	Reference Number
1	Thermometer, Dial (50 - 300° F)	931F40 NIIN 00-174-6239
2	Ultrasonic Tank and Generator, Blackstone	Model HT-1206-NOC

NOTE

Two ultrasonic tanks are required for the Navy Oxygen Cleaning process. One ultrasonic tank will be used for the mixture of Navy Oxygen Cleaning agent and distilled water, and one ultrasonic tank will be used for the distilled water rinse.

Ultrasonic tanks require a heater test upon issue, distilled water will be used in both ultrasonic tanks for this inspection only.

1. Clean ultrasonic tank in accordance with paragraph 4-12.

2. Connect ultrasonic tank power cord to a 110/115 volt power outlet.

WARNING

To guard against ELECTRICAL SHOCK, ensure fluids are not splashed on switches or power cords during filling of ultrasonic tank.

3. Ensure drain valve on ultrasonic tank is closed.

4. Pour 100% distilled water into ultrasonic tank to fill line (approximately 1 to 2 inches from the top).

NOTE

It should take approximately 60 minutes for the distilled water to reach 150°F.

5. Turn tank (RED) ON/OFF switch to ON. Set heat control knob to 150°F and heat distilled water for 60 minutes. After 60 minutes, use thermometer and check temperature of distilled water in ultrasonic tank. The distilled water shall reach an operating temperature of 150°F. If temperature is slightly below 150°F adjust heat control knob to attain required temperature. If distilled water in ultrasonic tank fails to reach operating temperature within 90 minutes, troubleshoot ultrasonic tank in accordance with applicable technical manual.

6. Turn generator (GREEN) ON/OFF switch to ON. An audible hissing sound should be heard and the distilled water should have a visible vibration/agitation.

7. If no discrepancies are noted, proceed to paragraph 4-14 ultrasonic tank draining. If ultrasonic tank fails steps 5 or 6, secure power and proceed to applicable technical manual for maintenance.

4-12. ULTRASONIC TANK AND CONTAINER CLEANING. The ultrasonic tank and pre-cleaning containers will require cleaning prior to first use or when the shake test or pH test results indicate changing of the solution. To clean the ultrasonic tank and pre-cleaning containers, proceed as follows:

Materials Required

Quantity	Description	Reference Number
1	Container, Disposable, 5 Gallon (Authorized by Local Hazardous Waste Facility)	—
As Required	Gloves	NIIN 00-462-0832
As Required	Navy Oxygen Cleaner	OCC-RTU NIIN 01-389-3859
As Required	Paper Towel, Type VI (Industrial Wiping)	A-A-1432 NIIN 00-823-9772

Support Equipment Required

Quantity	Description	Reference Number
As Required	Apron, Impermeable, Cotton Duck, Rubber Coated	MIL-A-41829 (CAGE 81349) NIIN 00-082-6108
As Required	Goggles or Face Shield	NIIN 00-052-3776
2	Ultrasonic Tank and Generator, Blackstone	Model HT-1206-NOC
3	Water Pail, 2 to 3 Gallon, Plastic or Metal	Local Purchase

NOTE

Eye protection, gloves and apron are required to be worn during any cleaning process.

If the Navy Oxygen Cleaner is spilled, wipe up immediately, hard white deposits will form if allowed to dry. Area can be cleaned with either a mixture of one pound citric acid to one gallon of water, or white vinegar. After spill is cleaned, wipe down affected area with distilled water.

1. Don gloves, apron and eye protection. Wash donned gloves in warm tap water to remove all traces of talcum powder prior to cleaning ultrasonic tank or handling cleaning agents.

NOTE

A 5 gallon disposal container, authorized by local hazardous waste facility should be available to dispose of cleaning solutions.

2. Ultrasonic tanks/containers shall be cleaned as follows:

a. Pour a small amount of Navy Oxygen Cleaner into ultrasonic tank or container. Wipe down all sides with wetted paper towel. Discard paper towel.

b. Drain ultrasonic tank contents into disposal container by opening drain valve. After ultrasonic tank has drained, close drain valve.

c. Pour a small amount of distilled water into ultrasonic tank or container. Wipe down all sides with new wetted paper towel. Discard paper towel.

d. Drain distilled water from ultrasonic tank into disposal container by opening drain valve. After ultrasonic tank has drained, close drain valve.

NOTE

Step e is required on the distilled water ultrasonic tank and pre-cleaning containers only.

e. For distilled water ultrasonic tank and pre-clean containers only, repeat steps c and d.

3. Wipe down all sides of the ultrasonic tank with a clean, lint free, paper towel until dry. Ensure ultrasonic tank or container is visibly clean of particulates.

4. Pre-cleaning and rinse containers shall be cleaned prior to each use by using procedures in step 2 and 3.

5. If ultrasonic tanks are to be used to clean components proceed to paragraph 4-13. Remove gloves.

6. If no component cleaning is required, ultrasonic tanks can be stored at this time.

4-13. ULTRASONIC TANK FILLING. To fill the ultrasonic tanks for use, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Alkacid Test Kit	A-988 NIIN 00-420-0507
As Required	Distilled Water	NIIN 00-356-4936
As Required	Gloves	NIIN 00-462-0832
As Required	Navy Oxygen Cleaner	OCC-RTU NIIN 01-389-3859

Support Equipment Required

Quantity	Description	Reference Number
As Required	Apron, Impermeable, Cotton Duck, Rubber Coated	MIL-A-41829 (CAGE 81349) NIIN 00-082-6108
2	Bottle, Small Plastic, (Specify Clear)	NIIN 00-042-8421
As Required	Goggles or Face Shield	NIIN 00-052-3776
1	Tongs, Rubber-ended	NIIN 00-293-0808
2	Ultrasonic Tank and Generator, Blackstone	Model HT-1206-NOC
3	Water Pail, 2 to 3 Gallon, Plastic or Metal	Local Purchase

1. Ensure ultrasonic tank has been cleaned in accordance with paragraph 4-12.

2. Ensure drain valve on ultrasonic tank is closed.

WARNING

Ensure level of Navy Oxygen Cleaner solution and distilled water do not drop below fill line or 2 inches from the top of the ultrasonic tanks. Damage to the heating coil could result.

Keep lids on ultrasonic tanks at all times to guard against degradation of solution.

3. Fill one ultrasonic tank with 100% distilled water. Ensure ultrasonic tank is filled to fill line (1 to 2 inches from the top of tank). Perform pH test as follows:

a. Tear off approximately 2 inches of number 03 pH paper. Dip half the paper into the distilled water ultrasonic tank. Remove pH paper.

b. Match the color of the wetted sample with the color coded pH scale on the tape container.

c. If pH is between 6.5 and 8.0, the sample is good. Proceed to step 4.

d. If pH exceeds 8.0, the distilled water ultrasonic tank has been contaminated with Navy Oxygen Cleaner. Re-clean ultrasonic tank in accordance with paragraph 4-12, steps 2 and 3.

4. Don gloves, apron and eye protection. Wash donned gloves in warm tap water to remove all traces of talcum powder prior to handling cleaning agents.

CAUTION

Ensure the solution mixture of Navy Oxygen Cleaner and Distilled Water is approximately 50% Navy Oxygen Cleaner and 50% distilled water. A 100% solution of the Navy Oxygen Cleaner will damage anodized aluminum parts.

5. Pour approximately one gallon of Navy Oxygen Cleaner into container marked pre-clean (paragraph 4-17, step 7) and perform shake test as follows:

a. Using rubber-ended tongs, grasp small bottle and take a sample of the Navy Oxygen Cleaner. Place cap on bottle.

b. Vigorously shake bottle for 15 seconds. Bubbles shall form on the surface of the Navy Oxygen Cleaner.

c. If bubbles dissipate in approximately 2 minutes, the cleaner is good, proceed to step e.

d. If bubbles remain 5 or more minutes, the Navy Oxygen Cleaner is contaminated. Turn in Navy Oxygen Cleaner to local hazardous waste coordinator. Clean container in accordance with paragraph 4-12, steps 2 and 3.

e. Pour contents of bottle back into container. Thoroughly rinse sample bottle with warm tap water and allow to air dry for next use. Proceed to step 6.

6. Pour the Navy Oxygen Cleaner from the container used in step 5 into the second ultrasonic tank. Using approximately 1 gallon of distilled water, fill the remainder of the ultrasonic tank to the full line (1 to 2 inches from the top).

7. Connect both ultrasonic tank power cords to 110/115 volt power outlet.

8. Ultrasonic tanks are ready for use. Tanks can remain full and covered when not in use. Proceed to Section 4-3 for component cleaning.

4-14. ULTRASONIC TANK DRAINING. To drain the ultrasonic tank, proceed as follows:

Materials Required

Quantity	Description	Reference Number
1	Container, Disposable, 5 Gallon (Authorized by Local Hazardous Waste Facility)	—

Support Equipment Required

Quantity	Description	Reference Number
2	Ultrasonic Tank and Generator, Blackstone	Model HT-1206-NOC

1. Ensure tank (RED) ON/OFF switch and generator (GREEN) ON/OFF switch are in the OFF position. Allow contents to cool enough to safely drain ultrasonic tank.

2. Unplug power cord from ultrasonic tank to be drained.

NOTE

A 5 gallon container, authorized by local hazardous waste facility should be available to dispose of solutions during ultrasonic tank draining.

3. Position 5 gallon container under drain valve on ultrasonic tank. Slowly open drain valve and drain ultrasonic tank. Close drain valve.

4. Proceed to paragraph 4-12, Ultrasonic Tank Cleaning.

Section 4-4. Component Cleaning

4-15. GENERAL.

4-16. This section contains procedural steps for the precleaning, cleaning process, inspection and component storage. For cleaning of oxygen lines, refer to Section 4-5.

WARNING

Disposable gloves shall be worn while working with Navy Oxygen Cleaner. Although the substance is not toxic, it is very alkaline and can cause drying of the hands and burning of open sores. Avoid prolonged breathing of vapors while solution is heated. Eye protection shall be worn during cleaning process.

NOTE

A 5 gallon disposal container, authorized by local hazardous waste facility should be available to dispose of pre-clean solutions after cleaning process.

4-17. CLEANING PREPARATION. To prepare for the cleaning process, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Detergent, Non-ionic, Type 1	MIL-D-16791 NIIN 00-282-9699
As Required	Distilled Water	NIIN 00-356-4936
As Required	Gloves	NIIN 00-462-0832
As Required	Navy Oxygen Cleaner	OCC-RTU NIIN 01-389-3859

Support Equipment Required

Quantity	Description	Reference Number
As Required	Apron, Impermeable, Cotton Duck, Rubber Coated	MIL-A-41829 (CAGE 81349) NIIN 00-082-6108
2	Bottle, Small Plastic, (Specify Clear)	NIIN 00-042-8421
As Required	Goggles or Face Shield	NIIN 00-052-3776
1	Thermometer, Dial (50-300° F)	931F40 NIIN 00-174-6239
1	Tongs, Rubber-ended	NIIN 00-293-0808
2	Ultrasonic Tank and Generator, Blackstone	Model HT-1206-NOC
3	Water Pail, 2 to 3 Gallon, Plastic or Metal	Local Purchase

1. Ensure ultrasonic tanks are visibly clean. If Navy Oxygen Cleaner or distilled water ultrasonic tanks appear dirty with particulate, drain ultrasonic tank/tanks in accordance with paragraph 4-14.

2. Don gloves, apron and eye protection. Wash donned gloves in warm tap water to remove all traces of talcum powder prior to handling cleaning agents.

3. Using rubber-ended tongs grasp small bottle and carefully dip bottle into Navy Oxygen Cleaner ultrasonic tank and take a sample of the Navy Oxygen Cleaner. Place cap on bottle and perform shake test as follows:

a. Vigorously shake bottle for 15 seconds. Bubbles shall form on the surface of the Navy Oxygen Cleaner.

b. If bubbles dissipate in approximately 2 minutes, the Navy Oxygen Cleaner is good, proceed to step 4.

c. If bubbles remain 5 minutes or more, the Navy Oxygen Cleaner is contaminated. Proceed to paragraph 4-14, Ultrasonic Tank Draining.

d. After test is completed, pour contents of bottle back into Navy Oxygen Cleaner ultrasonic tank. Thoroughly rinse sample bottle with warm tap water and allow to air dry for next use.

4. Ensure ultrasonic tanks are filled to full line (1 to 2 inches from the top of ultrasonic tank). If Navy Oxygen Cleaner ultrasonic tank is low, add equal parts of Navy Oxygen Cleaner and distilled water until ultrasonic tank is full. If distilled water ultrasonic tank is low, add distilled water as required until ultrasonic tank is full.

5. Connect ultrasonic tank power cords to 110/115 volt outlet.

NOTE

Both ultrasonic tank solutions will take approximately 60 minutes to reach 150°F.

Steps 7 and 8 can be performed while heating process in step 6 is being performed.

6. Turn tank (RED) ON/OFF switches on both ultrasonic tanks to ON. Set heat control knobs to 150°F on both ultrasonic tanks and heat for 60 minutes.

7. Using three 2 to 3 gallon containers; Mark the first container pre-clean detergent. Mark the second container rinse 1 and mark the third container rinse 2. Clean containers in accordance with paragraph 4-12, steps 2 and 3.

CAUTION

When performing step 8 do not use more than 1/2 ounce of non-ionic detergent to one gallon of distilled water. Cleaning effectiveness does not improve with additional detergent. Excessive amount of detergent will be difficult to rinse off and increase the chance of carry-over into Navy Oxygen Cleaner solution.

8. Pour one gallon of distilled water into the container marked as pre-clean detergent. Add 1/2 an ounce of non-ionic detergent and mix thoroughly.

9. Pour one gallon of distilled water into rinse container 1. Pour one gallon of distilled water into rinse container 2.

WARNING

Liquids will be hot. Do not put hands into ultrasonic tanks.

NOTE

If temperature cannot be achieved during step 10 within 90 minutes, stop the cleaning process and troubleshoot the ultrasonic tank in accordance with the appropriate technical manual.

10. Using thermometer, ensure distilled water and Navy Oxygen Cleaner ultrasonic tanks have reached 150°F.

11. Turn generator (GREEN) ON/OFF switches on both ultrasonic tanks to ON. Ensure both ultrasonic tanks have a audible hissing sound and a visible vibration of liquid. Allow both ultrasonic tanks to operate for 10 minutes to de-gas liquids prior to putting components into the ultrasonic tanks. Proceed to paragraph 4-18 for component cleaning. Paragraph 4-18, steps 1 through 4 can be performed while ultrasonic tanks are de-gassing.

4-18. CLEANING OF COMPONENTS. To perform component cleaning, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Alkacid Test Kit	A-988 NIIN 00-420-0507
As Required	Bag, Plastic	MIL-B-117 (CAGE 81349)
As Required	Detergent, Non-ionic, Type 1	MIL-D-16791 NIIN 00-282-9699
As Required	Distilled Water	NIIN 00-356-4936
As Required	Gloves	NIIN 00-462-0832
As Required	Navy Oxygen Cleaner	OCC-RTU NIIN 01-389-3859
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
As Required	Apron, Impermeable, Cotton Duck, Rubber Coated	MIL-A-41829 (CAGE 81349) NIIN 00-082-6108
2	Bottle, Small Plastic, (Specify Clear)	NIIN 00-042-8421
As Required	Brush, Acid Swabbing	A-A-289 NIIN 00-514-2417
As Required	Goggles or Face Shield	NIIN 00-052-3776
1	Tongs, Rubber-ended	NIIN 00-293-0808
2	Ultrasonic Tank and Generator, Blackstone	Model HT-1206-NOC
3	Water Pail, 2 to 3 Gallon, Plastic or Metal	Local Purchase

1. Visually inspect components for foreign material, contamination and stickers etc. Remove as much foreign materials as possible prior to pre-cleaning components.

NOTE

The pre-cleaning process is extremely important, extreme care should be taken to ensure all items have been thoroughly cleaned and rinsed. Failure to pre-clean components thoroughly will result in excessive man hours draining, cleaning and filling ultrasonic tanks.

2. Place component into pre-clean solution container. Ensure component is submerged completely. Scrub each component in the solution with a soft bristle brush. Use additional brushes as required to clean passageways and ports if required.

3. Remove component and place in rinse container 1. Agitate component several times. Remove component and shake off excess water. Visually inspect component for contamination. If component is visually clean perform step 4. If component is visually contaminated repeat steps 2 and 3.

NOTE

Several components can be placed in the basket. Ensure components are not overlapping or stacked on each other.

4. Place component into ultrasonic tank basket. If additional components require cleaning, perform steps 1 through 4. If not, proceed to step 5.

WARNING

Liquids will be hot. Do not put hands into ultrasonic tanks. Use rubber-ended tongs to deposit and remove parts.

Keep ultrasonic tank lid installed at all times. Lids should be removed only as required for installing/removing parts from basket, checking temperature, taking samples or agitating components.

5. This cleaning process step requires 15 minutes to complete and shall be performed by placing parts basket into ultrasonic tank of the 50% solution of Navy Oxygen Cleaner. Agitate parts twice at 5 minute intervals by manually grasping parts basket handles and shake submerged parts in basket several times. Rubber-ended tongs can also be used to agitate parts during this process. After 15 minutes has elapsed, immediately perform step 6.

6. Turn Generator (GREEN) ON/OFF switch on Navy Oxygen Cleaner ultrasonic tank to OFF. Perform shake test as follows:

a. Using rubber-ended tongs, grasp small bottle and take a sample of the Navy Oxygen Cleaner. Place cap on bottle.

b. Vigorously shake bottle for 15 seconds. Bubbles will form on the surface of the Navy Oxygen Cleaner.

c. If bubbles dissipate in approximately 2 minutes the cleaner is good, proceed to step e.

d. If bubbles remain 5 or more minutes, the Navy Oxygen Cleaner is contaminated. Proceed to step 7.

e. Pour contents of bottle back into Navy Oxygen Cleaner ultrasonic tank. Thoroughly rinse sample bottle with warm tap water and allow to air dry for next use. Proceed to step 8.

7. Remove parts and immediately rinse with distilled water. Turn tank (RED) ON/OFF switch to OFF. Allow ultrasonic tank to cool. The ultrasonic tank shall be drained, cleaned and filled in accordance with paragraphs 4-14, 4-12 and 4-13. The parts shall be recleaned again accordance Section 4-4, Component Cleaning.

8. Remove parts basket. Immediately remove parts from basket and rinse components in rinse container 2.

9. Place parts in rinse ultrasonic tank basket. Place basket of parts in the ultrasonic tank with distilled water. Allow parts to agitate for 5 minutes.

10. Turn Generator (GREEN) ON/OFF switch on distilled water tank to OFF. Remove gloves and perform pH test as follows:

a. Tear off approximately 2 inches of number 03 pH paper. Dip half the paper into the distilled water ultrasonic tank. Remove pH paper.

b. Match the color of the wetted sample with the color coded pH scale on the tape container.

c. IF pH is between 6.5 and 8.0, the sample is good. Proceed to step 12.

d. If pH exceeds 8.0, the distilled water ultrasonic tank has been contaminated with Navy Oxygen Cleaner. Proceed to step 11.

11. Turn tank (RED) ON/OFF switch to OFF. Allow ultrasonic tank to cool. The ultrasonic tank shall be drained, cleaned and filled in accordance with paragraphs 4-14, 4-12, and 4-13. Repeat steps 9 and 10 until pH sample passes test.

12. Remove parts and blow dry larger parts with oil-free nitrogen. Allow smaller parts to air dry on clean surface. Ensure that parts are completely dry before reassembling.

13. If no other component cleaning is required, place tank (RED) ON/OFF switches on both ultrasonic tanks to OFF. Ensure lids are installed on ultrasonic tanks. If additional component cleaning is required, repeat paragraph 4-17, steps 1 through 12.

14. Prior to installation, wash all silicone rubber parts in distilled water and blow dry with oil-free nitrogen.

15. Cleaned parts shall be sealed in plastic bags for storage. Bag all complete assemblies that are not immediately returned to service.

Section 4-5. Oxygen Line Cleaning

4-19. GENERAL.

4-20. This section contains procedural steps for oxygen line cleaning.

4-21. CLEANING OF OXYGEN LINES.

Materials Required

Quantity	Description	Reference Number
As Required	Cleaning Compound, Oxygen, Type I	MIL-C-81302 (CAGE 81349)
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275
As Required	Soap, Liquid, Ivory Dishwashing or Equivalent	Purchase Locally

Support Equipment Required

Quantity	Description	Reference Number
1	Cup and Gun Assembly	NIIN 00-270-1044
1	Regulator, Nitrogen	9-580 or Equivalent

WARNING

Do not use oil, or any material containing oil, in conjunction with oxygen equipment. Oil, even in a minute quantity, coming in contact with oxygen can cause explosion or fire. Dust, lint and fine metal particles are also dangerous.

Use only small amounts of oxygen cleaning compound at a time. Use in a well ventilated open space. Avoid prolonged breathing. Oxygen cleaning compound vapors are hazardous and can cause death if too much is inhaled.

1. Mix a solution of Ivory Dishwashing Liquid and warm water in a clean container.

2. Plug one end of the oxygen line to be cleaned. Pour solution of dishwashing liquid and warm water into line.

3. Plug remaining end of oxygen line and shake line to agitate dishwashing solution.

4. Unplug one end of oxygen line and pour dishwashing solution out of oxygen line.

5. Repeat steps 2 through 4 four more times.

6. Remove plugs from both ends of oxygen line.

7. Clean fitting ends of oxygen line with dishwashing solution using a soft bristle brush.

8. Thoroughly rinse oxygen line of all dishwashing solution using warm water.

WARNING

When using oxygen cleaning compound, ensure space is well ventilated. Avoid prolonged breathing of oxygen cleaning compound vapors.

9. Fill pint container cup of spray gun assembly with oxygen cleaning compound.

10. Connect nitrogen regulator to an oil free nitrogen supply cylinder.

11. Connect cup and gun assembly to the regulated nitrogen source.

12. Ensure nitrogen regulator adjuster knob is back out counterclockwise until spring tension is released.

13. Turn on nitrogen supply cylinder.

14. Hold oxygen line pointing down with one end in a container such as a bucket.

15. Point nozzle of gun assembly into end of oxygen line.

16. Turn nitrogen adjuster knob clockwise until 30 psig is indicated on nitrogen regulator outlet gage.

17. Spray interior of oxygen line until contents of gun cup assembly is half full (approximately 1/2 cup remaining).

18. Turn nitrogen regulator counterclockwise until spring tension is released and close nitrogen supply cylinder.

19. Using oxygen cleaning compound wipe entire exterior of oxygen line clean.

20. Purge oxygen line with heated nitrogen until dry and odor free.

21. Cleaned oxygen line shall be capped and bagged (if possible) after any cleaning process. The oxygen line shall remain capped until placed in service.

Section 4-6. Oxygen Line Cleaning (Using Oxygen Line Flushing Set)

4-22. GENERAL.

4-23. This section contains procedural steps for oxygen line cleaning.

4-24. CLEANING OF OXYGEN LINES USING OXYGEN LINE FLUSHING SET.

NOTE

Some activities may not have received the oxygen line flushing set. For those activities, oxygen line cleaning must be accomplished by using procedures outlined in Section 4-5 of this chapter, until receipt of the oxygen line flushing set.

Materials Required

Quantity	Description	Reference Number
As Required	Detergent, Non-Ionic, Type 1	MIL-D-16791 NIIN 00-282-9699
As Required	Distilled Water	NIIN 00-356-4936
As Required	Gloves	NIIN 00-462-0832
As Required	Navy Oxygen Cleaner	OCC-RTU NIIN 01-389-3859

Support Equipment Required

Quantity	Description	Reference Number
As Required	Apron, Impermeable, Cotton Duck, Rubber Coated	MIL-A-41829 (CAGE 81349) NIIN 00-082-6108
2	Bottle, Small, Plastic, Clear	NIIN 00-042-8421
As Required	Goggles or Face Shield	NIIN 00-052-3776
1	Thermometer, Dial (50-300°F)	931F40 NIIN 00-174-6239
2	Ultrasonic Tank and Generator, Blackstone	Model HT-1206-NOC
3	Water Pail, 2 to 3 Gallon, Plastic or Metal	Local Purchase
1	Tongs, Rubber-ended	NIIN 00-293-0808
1	Purge Unit, Aircraft and Liquid Oxygen Converter	3447AS100-1
1	Oxygen Line Flushing Set	3719AS100-1

1. Ensure ultrasonic tanks are visibly clean. If Navy Oxygen Cleaner or distilled water ultrasonic tanks appear dirty with particulate, drain ultrasonic tank/tanks in accordance with paragraph 4-14.

2. Don gloves, apron, and eye protection. Wash donned gloves in warm tap water to remove all traces of talcum powder prior to handling cleaning agents.

3. Using rubber-ended tongs, grasp small bottle and carefully dip bottle into Navy Oxygen Cleaner ultrasonic tank and take a sample of the Navy Oxygen Cleaner. Place cap on bottle and perform shake test as follows:

a. Vigorously shake bottle for 14 seconds. Bubbles shall form on the surface of the Navy Oxygen Cleaner.

b. If bubbles dissipate in approximately 2 minutes, the Navy Oxygen Cleaner is good. Proceed to step 3.d.

c. If bubbles remain 5 or more minutes, the Navy Oxygen Cleaner is contaminated. Proceed to step 4.

d. Pour contents of bottle back into Navy Oxygen Cleaner ultrasonic tank. Thoroughly rinse sample bottle with warm water and allow to air dry for next use. Proceed to step 5.

4. The ultrasonic tank shall be drained, cleaned and filled in accordance with paragraphs 4-14, 4-12, and 4-13.

5. Ensure ultrasonic tanks are filled to full line (1 to 2 inches from top of ultrasonic tank). If Navy Oxygen Cleaner ultrasonic tank is low, add equal parts of Navy Oxygen Cleaner and distilled water until ultrasonic tank is full. If distilled water in ultrasonic tank is low, add distilled water as required until ultrasonic tank is full.

6. Connect ultrasonic tank power cords to 110/115 volt outlet.

NOTE

Both ultrasonic tank solutions will take approximately 60 minutes to reach 150°F. Steps 8 and 9 can be performed while heating process in step 7 is being performed.

7. Turn tank (RED) ON/OFF switches on both ultrasonic tanks to ON. Set heat control knobs to 150°F on both ultrasonic tanks and heat for 60 minutes.

8. Pre-clean line to be cleaned using non-ionic detergent in accordance with paragraph 4-18, steps 1 thru 3.

NOTE

Figure 4-3 illustrates the Oxygen Line Flushing Set with 1.9 gallon ultrasonic tank. Index numbers refer to figure 4-3 unless otherwise noted.

Not all oxygen line adapters are included in set, some adapters will have to be locally procured.

9. Open Oxygen Line Flushing Set lid and locate proper size adapters for oxygen line to be cleaned.

NOTE

Tighten all adapters hand tight, then 1 to 2 full turns more.

10. Connect one line adapter to outlet of pump (1). Connect second adapter to end of return line (2) without quick disconnect. Mark this line “Return Line.” Connect line to be cleaned (3) between pump outlet line adapter and return line.

11. Connect end of return line (2) with quick disconnect to quick connect inlet (4) of NOC filter.

12. Remove hose assembly with two quick disconnects (5) from lid storage. Connect one end to quick connect of the outlet (6) of NOC filter. Mark this line "NOC Only."

13. Connect the other end of hose assembly (5) to the quick connect (7) of modified lid on the NOC tank (8).

14. Remove another hose assembly with two quick-disconnects (9) and connect one end to the quick connect inlet (11) of the pump. Connect the other end to the quick connect (10) of the outlet of the NOC tank. Mark this line "NOC Only."

15. Ensure regulator knob on air supply is turned fully counterclockwise.

16. Connect air supply (12) to pump quick connect.

WARNING

Liquids will be hot. Do not put hands into ultrasonic tanks.

NOTE

If temperature cannot be achieved during step 17 within 90 minutes, stop the cleaning process and troubleshoot the ultrasonic tank in accordance with the appropriate technical manual.

17. Using thermometer, ensure NOC tank and distilled water tanks have reached a temperature of 150°F.

18. Turn shutoff valve on NOC tank to the OPEN position.

19. Slowly adjust air supply by turning regulator knob clockwise until 80 psi is indicated on the air pressure gage.

NOTE

As pump is running, check to ensure liquid is not below dotted line. If liquid is below, add equal amounts of distilled water and NOC to NOC tank.

20. Allow cleaning process to circulate for 30 minutes.

21. After 30 minutes, reduce air supply pressure by turning regulator knob counterclockwise until 20 psi is on air pressure gage.

22. Turn shutoff valve on NOC tank to the CLOSED position.

23. Let pump cycle 8 to 10 times and then turn regulator knob counterclockwise until 0 psi is on air pressure gage and pump stops.

4-25. FIRST RINSE.

WARNING

Lines will be hot; be sure to use gloves when removing and installing lines on tank.

NOTE

Index numbers for steps 1 and 2 refer to figure 4-3.

1. Remove hose assembly (9) from pump inlet quick connect fitting (11) and NOC tank outlet quick connect fitting (10). Drain liquid from tubing, and store in Oxygen Line Flushing Set lid.

2. Remove hose assembly (5) from NOC tank lid quick connect fitting (7) and NOC filter outlet quick connect fitting (6). Drain liquid from tubing, and store in Set lid.

NOTE

Index numbers for steps 3 thru 8 refer to figure 4-4.

3. Remove from lid of Set one hose assembly with only one quick disconnect (13) and mark "Rinse Line #1."

4. Connect quick disconnect of hose assembly (13) to quick connect on inlet (11) of pump and place other end into 5 gallon container (14) of distilled water.

5. Disconnect return line (2) from inlet (4) of NOC filter and place into empty 5 gallon container (15) marked "Old NOC/Water."

6. Turn regulator knob clockwise until 20 psi is on air pressure gage and cycle pump 8 to 10 times.

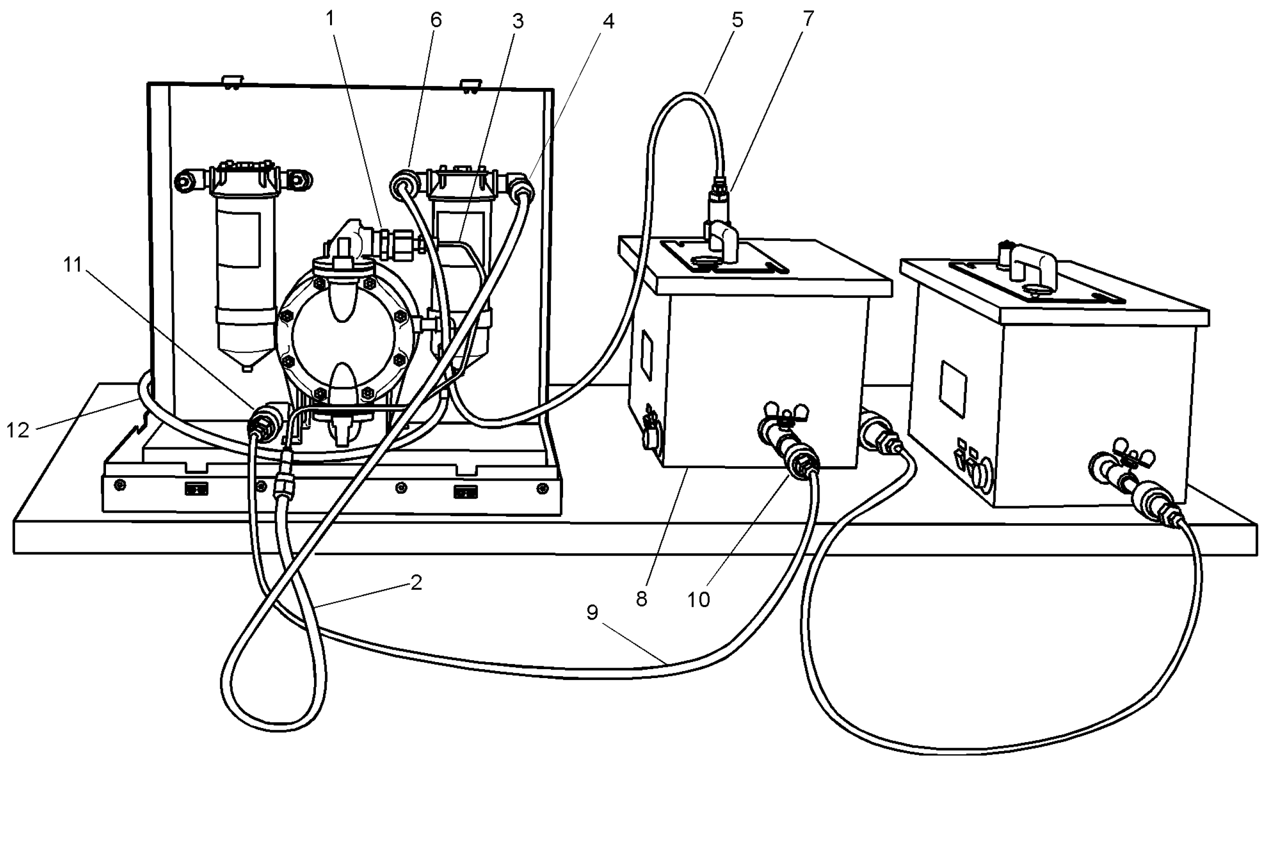

Figure 4-3. Line Flushing Set Interface with Ultrasonic Cleaning Tanks (Line Cleaning)

7. After 8 to 10 cycles, turn regulator knob counterclockwise until no pressure is shown on air pressure gage and pump stops.

8. Disconnect rinse line #1 (13) quick disconnect from quick connect at pump inlet (11). Drain line and store in Set lid.

4-26. FINAL RINSE.

1. Perform pH test as follows:

a. Tear off approximately two inches of number 03 pH paper. Dip half the paper into the distilled water ultrasonic tank. Remove pH paper.

b. Match the color of the wetted sample with the color coded pH scale on the tape container.

c. If pH is between 6.5 and 8.0, the sample is good. Proceed to step two.

d. If pH exceeds 8.0, the distilled water ultrasonic tank has been contaminated with Navy Oxygen Cleaner. Re-clean ultrasonic tank in accordance with paragraph 4-12, steps 2 and 3.

NOTE

Index numbers for steps 2 and 2A refer to figure 4-4 unless otherwise indicated.

2. Disconnect rinse line #1 (13) from pump inlet quick connect (11). Drain line and store in Set lid.

2A. Remove end of return line (2) from Old NOC/ Water container (15) and connect to filter inlet quick connect (16, figure 4-5).

NOTE

Index numbers for steps 3 thru 19 refer to figure 4-5.

3. Remove from Set lid hose assembly with two quick disconnects (17) and mark “Final Rinse #1”.

4. Connect one quick disconnect of hose assembly (17) to outlet of quick connect (18) of water filter and connect the other quick disconnect of hose assembly (17) to the quick connect (19) on modified lid of water tank (20).

5. Remove from Set lid one hose assembly with two quick disconnects (21) and mark “Final Rinse #2”.

6. Connect one end of hose assembly (21) to quick connect (11) of the inlet pump.

7. Connect other quick disconnect of hose assembly (21) to quick connect (22) on outlet of distilled water tank.

8. Turn ON/OFF valve of distilled water tank to the OPEN position.

NOTE

As pump is running, check to insure water is not below dotted line. If water is below line, add distilled water to tank to correct level.

9. Turn regulator knob clockwise slowly until pressure gage reads 80 psi and allow to circulate for 30 minutes.

10. After 30 minutes, reduce air supply by turning regulator knob counterclockwise until 20 psi is on pressure gage.

11. Turn ON/OFF valve on distilled water tank to OFF and allow pump to cycle for 8 to 10 times.

12. Turn regulator knob counterclockwise until no pressure is on pressure gage and pump stops.

13. Remove hose assembly (21) from outlet (22) of distilled water tank and inlet (11) of pump and place back into lid of Set.

14. Remove hose assembly (17) from outlet (18) of water filter and quick connect (19) of modified distilled water tank lid and place back into lid of Set.

15. Remove return line (2) and attached adapter from end of oxygen line being cleaned (3) and remove from inlet (16) of distilled water filter. Remove adapter from return line (2) and place return line back into lid of Set and adapter in appropriate storage location in Set.

16. Remove cleaned oxygen line from adapter on pump outlet (1).

17. Turn ON/OFF power switch to OFF on Navy Oxygen Cleaner and distilled water tanks.

18. All lines and fittings shall be blown dried and purged using aircraft and liquid oxygen converter purge unit part number 3447AS100-1.

19. Cleaned oxygen lines shall be capped and bagged if possible after any cleaning process. The oxygen line shall remain bagged and capped until placed in service.

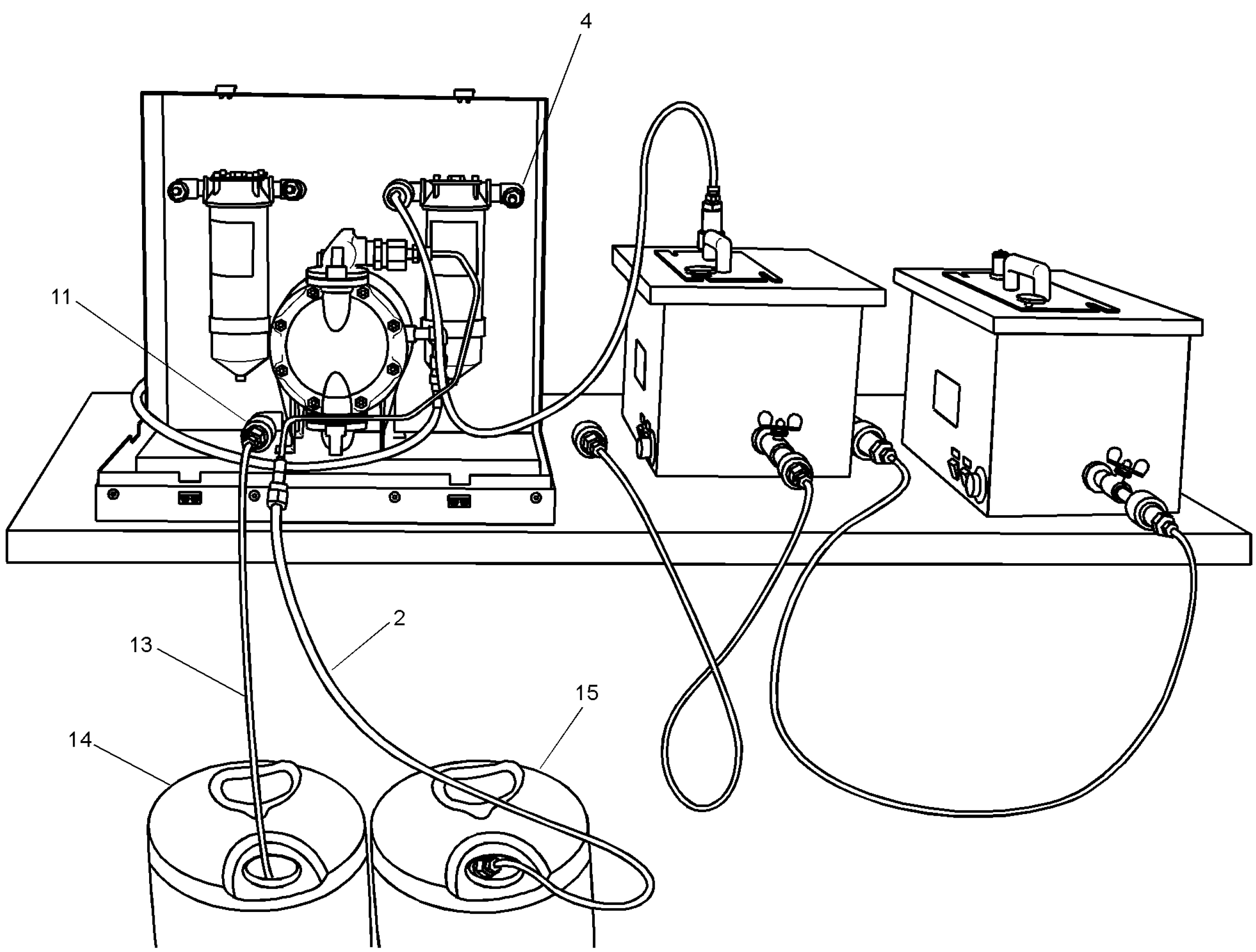

Figure 4-4. Line Flushing Set Interface with Ultrasonic Cleaning Tanks (First Rinse)

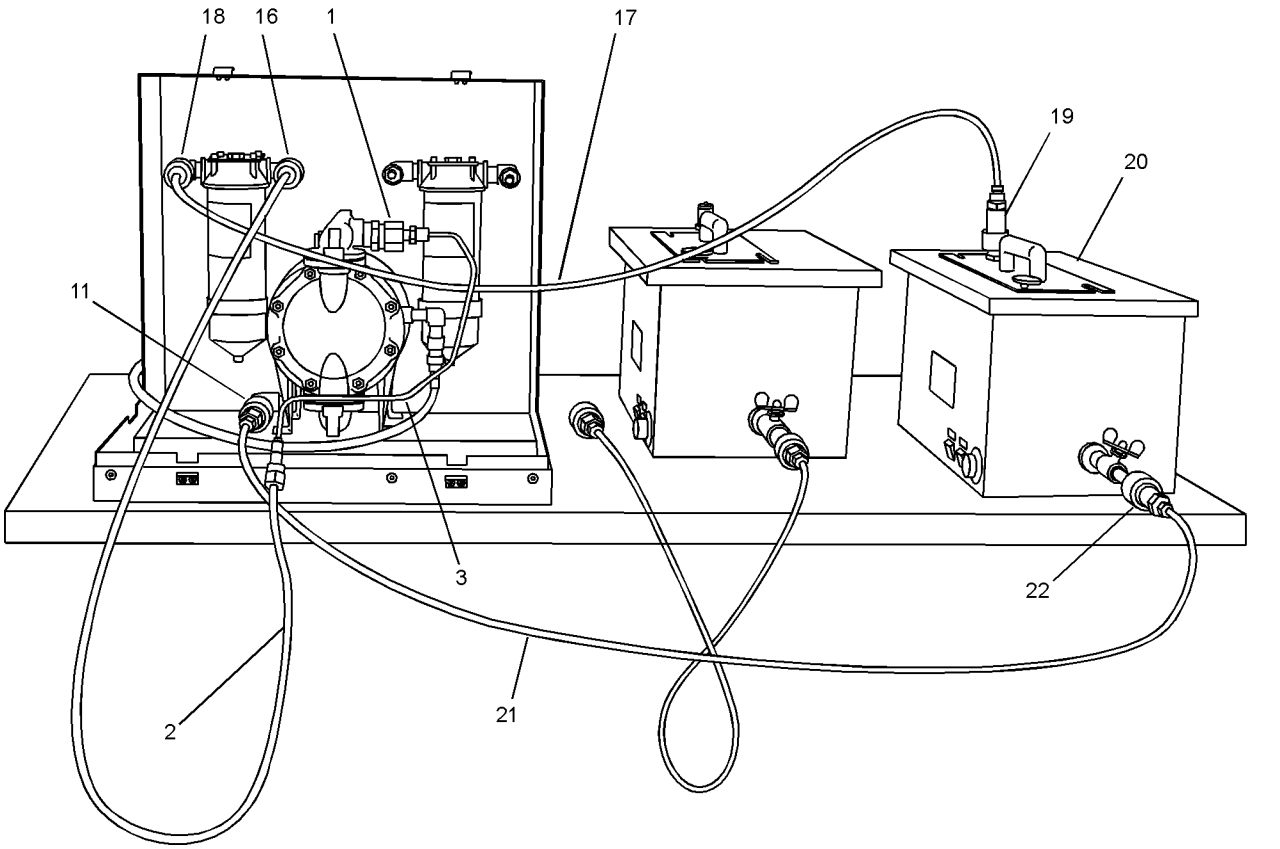

Figure 4-5. Line Flushing Set Interface with Ultrasonic Cleaning Tanks (Final Rinse)

Section 4-7. Illustrated Parts Breakdown

4-27. GENERAL.

4-28. This section lists and illustrates the procurable parts of the Oxygen Line Flushing Set, 3719AS100-1.

4-29. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

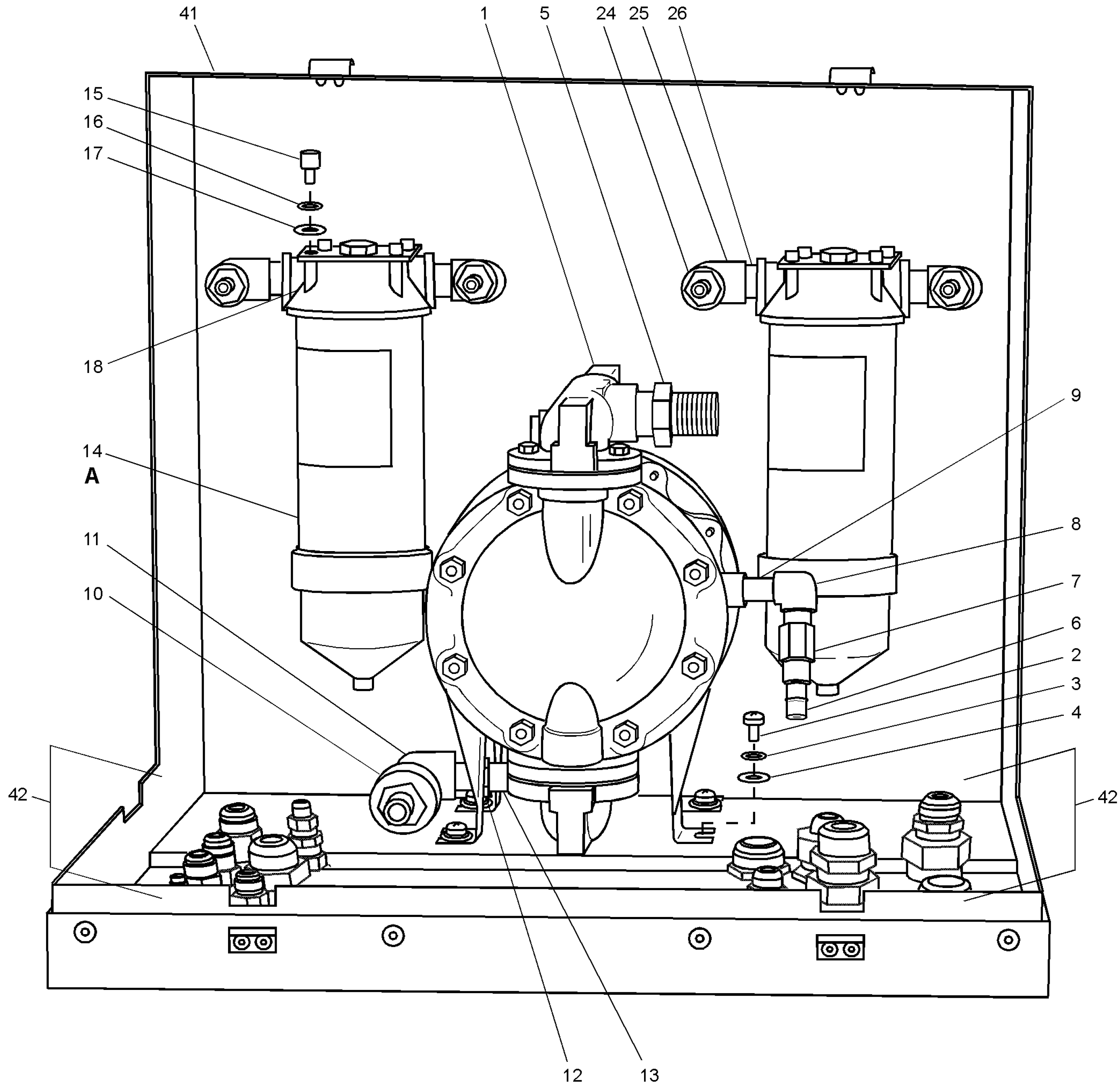

Figure 4-6. Oxygen Line Flushing Set (Sheet 1 of 3)

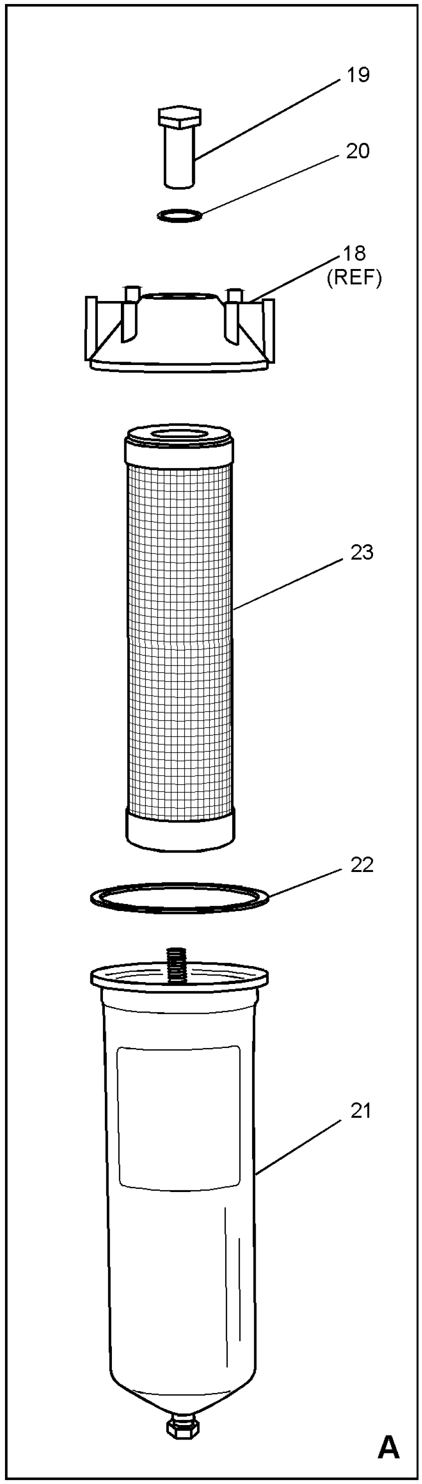

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Figure 4-6. Oxygen Line Flushing Set (Sheet 2)

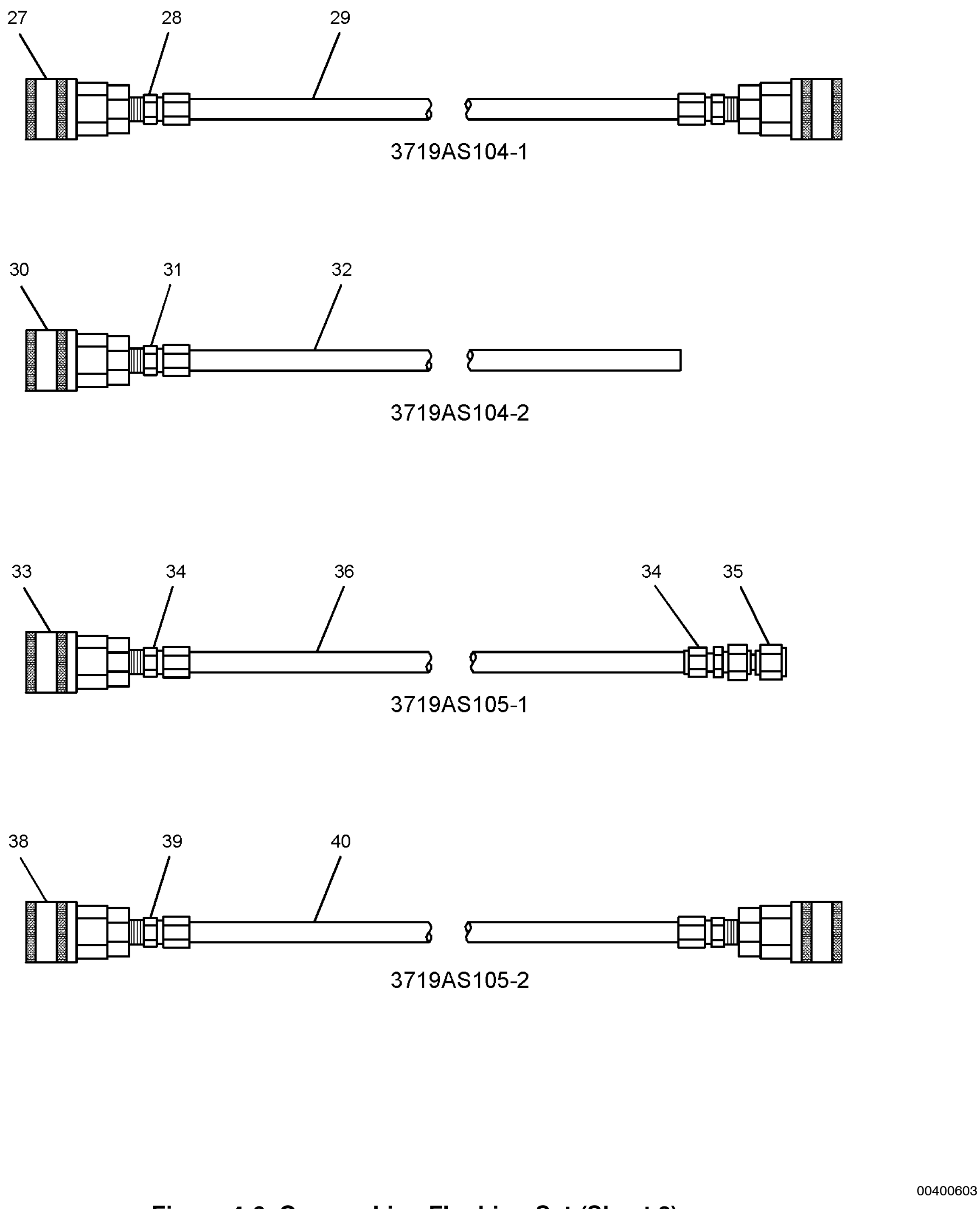

Figure 4-6. Oxygen Line Flushing Set (Sheet 3)

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-6	3719AS100-1	OXYGEN LINE FLUSHING SET	REF	
-1	3719AS107-1	. PUMP ASSEMBLY, 666111-244-C (03990) . . . . (ATTACHING PARTS)	1	
-2	NASM35308-307	. SCREW, Cap	4	
-3	MS35338-139	. LOCKWASHER	4	
-4	NASM15795-851	. FLAT WASHER . . . . ---*---	4	
-5	16FTX-S	. CONNECTOR, Male (30780)	1	
-6	6534K43	. QUICK DISCONNECT (39428)	1	
-7	SS-8-RA-4	. ADAPTER, Reducing (74717)	1	
-8	SS-4-E	. ELBOW (74717)	1	
-9	SS-4HLN-4.00	. NIPPLE, Hex Long (74717)	1	
-10	SVHN-8-8M	. QUICK DISCONNECT (78357)	1	
-11	SS-8-E	. ELBOW (74717)	1	
-12	SS-8-HNL-2.00	. NIPPLE, Hex Long (74717)	1	
-13	SS-16-RB-8	. BUSHING, Reducing (74717)	1	
-14	3719AS106-1	. FILTER ASSEMBLY, BSSB10-3/4 SD . . . . (13800) (ATTACHING PARTS)	2	
-15	NASM35307-303	. SCREW, Cap	4	
-16	MS35338-139	. LOCKWASHER	4	
-17	NASM15795-851	. FLAT WASHER . . . . ---*---	4	
-18	—	. . FILTER HEAD (13800)	1	
-19	4090-5202	. . ASSEMBLY, COVER NUT (13800)	1	
-20	6780-5005	. . WASHER (13800)	1	
-21	3719AS102-1	. . HOUSING, Filter (13800)	1	
-22	4150-5178	. . COVER O-RING BUNA-N, (13800)	1	
-23	PMG-030-10-F-A-D0	. FILTER ELEMENT (13800)	1	
-24	SVHN-8-8M	. QUICK DISCONNECT (78357)	4	
-25	SS-8-SE	. ELBOW, Street (74717)	4	
-26	SS-12-RB-8	. BUSHING, Reducing (74717)	4	
	3719AS104-1	. HOSE ASSEMBLY, Rinse Line	2	
-27	SVHC8-8F	. . COUPLING, Quick Release (78357)	2	
-28	SS-810-1-8	. . CONNECTOR, Male (74717)	2	
-29	5033K35	. . PTFE TUBING, 0.50 x 6 feet (39428)	1	
	3719AS104-2	. HOSE ASSEMBLY, Rinse Line	1	
-30	SVHC8-8F	. . COUPLING, Quick Release (78357)	1	
-31	SS-810-1-8	. . CONNECTOR, Male (74717)	1	
-32	5033K35	. . PTFE TUBING, 0.50 x 6 feet (39428)	1	
	3719AS105-1	. HOSE ASSEMBLY, Return Line	1	
-33	SVHC8-8F	. . COUPLING, Quick Release (78357)	1	

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-6-34	SS-810-1-8	. . CONNECTOR, Male (74717)	1	
-35	SS-810-A-8ANF	. . ADAPTER, AN (74717)	1	
-36	SS-810-6	. . TUBE UNION (74717)	1	
-37	5033K35	. . PTFE TUBING, 0.50 x 10 feet (39428)	1	
	3719AS105-2	. HOSE ASSEMBLY, NOC	2	
-38	SVHC8-8F	. . COUPLING, Quick Release (78357)	2	
-39	SS-810-1-8	. . CONNECTOR, Male (74717)	2	
-40	5033K35	. . PTFE TUBING, 0.50 x 6 feet, (39428)	1	
-41	3719AS108-1	. BOX ASSEMBLY	1	
-42	6XHX7-SS	ADAPTER, Tube (30780)	1	
	SPHN8-8M	COUPLING, Quick Disconnect (78357)	1	
	16-12-XHX6-SS	EXPANDER, 3/4″ Internal to 1″ External . . . . (30780)	1	
	16-10-TRBTX-SS	REDUCER, Tube End (30780)	1	
	16-12-TRBTX-SS	REDUCER, Tube End (30780)	1	
	16-4-TRBTX-SS	REDUCER, Tube End (30780)	1	
	16-5-TRBTX-SS	REDUCER, Tube End (30780)	1	
	16-6-TRBTX-SS	REDUCER, Tube End (30780)	1	
	16-8-TRBTX-SS	REDUCER, Tube End (30780)	1	
	8-HTX-SS	UNION (30780)	2	
	10-8-HTX-SS	UNION, Reducing (30780)	1	
	12-8-HTX-SS	UNION, Reducing (30780)	1	
	8-4-HTX-SS	UNION, Reducing (30780)	1	
	8-5-HTX-SS	UNION, Reducing (30780)	1	
	8-6-HTX-SS	UNION, Reducing (30780)	1	

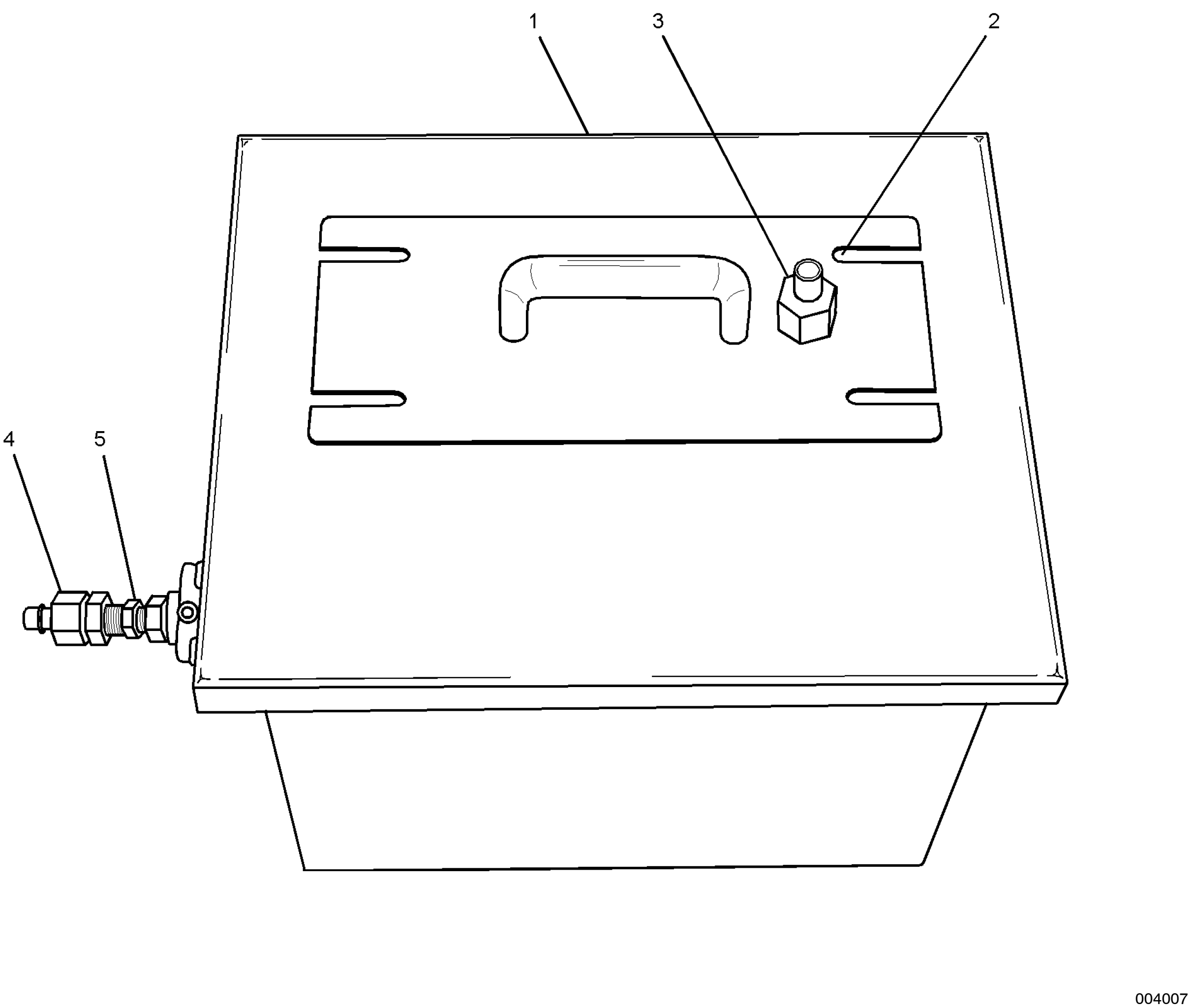

Figure 4-7. NOC Tank and Lid

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-7		NOC TANK ASSEMBLY	REF	
-1	HT-1206-NOC	. ULTRASONIC CLEANING TANK, ... 1.9 GALLON, HEATED (22723)	1	
-2	94805A233	. HEX NUT (NOT SHOWN) (39428)	1	
-3	SVHN8-8EB	. COUPLING, QUICK DISCONNECT . . . . (78357)	1	
-4	SVHN8-8F	. COUPLING, QUICK DISCONNECT . . . . (78357)	1	
-5	SS-8-HN	. NIPPLE PIPE, COUPLING (02570)	1	

NUMERICAL INDEX

Part Number	Figure and Index Number	SM&R Code
-	4-6-18	PAGZZ
-	4-7	PAGZZ
HT-1206-NOC	4-7-1	PAGZZ
MS35338-139	4-6-3	PAGZZ
	4-6-16	PAGZZ
NASM15795-851	4-6-4	PAGZZ
	4-6-17	PAGZZ
NASM35307-303	4-6-15	PAGZZ
NASM35308-307	4-6-2	PAGZZ
PMG-030-10-F-A-D0	4-6-23	PAGZZ
SPHN8-8M	4-6	PAGZZ
SS-12-RB-8	4-6-26	PAGZZ
SS-16-RB-8	4-6-13	PAGZZ
SS-4-E	4-6-8	PAGZZ
SS-4HLN-4.00	4-6-9	PAGZZ
SS-810-1-8	4-6-28	PAGZZ
	4-6-31	PAGZZ
	4-6-34	PAGZZ
	4-6-39	PAGZZ
SS-810-6	4-6-36	PAGZZ
SS-810-A-8ANF	4-6-35	PAGZZ
SS-8-E	4-6-11	PAGZZ
SS-8-HN	4-7-5	PAGZZ
SS-8-HNL-2.00	4-6-12	PAGZZ
SS-8-RA-4	4-6-7	PAGZZ
SS-8-SE	4-6-25	PAGZZ
SVHC8-8F	4-6-27	PAGZZ
	4-6-30	PAGZZ
	4-6-33	PAGZZ
	4-6-38	PAGZZ
SVHN8-8EB	4-7-3	PAGZZ
SVHN8-8F	4-7-4	PAGZZ
SVHN-8-8M	4-6-10	PAGZZ
	4-6-24	PAGZZ

Part Number	Figure and Index Number	SM&R Code
10-8-HTX-SS	4-6	PAGZZ
12-8-HTX-SS	4-6	PAGZZ
16-10-TRBTX-SS	4-6	PAGZZ
16-12-TRBTX-SS	4-6	PAGZZ
16-12-XHX6-SS	4-6	PAGZZ
16-4-TRBTX-SS	4-6	PAGZZ
16-5-TRBTX-SS	4-6	PAGZZ
16-6-TRBTX-SS	4-6	PAGZZ
16-8-TRBTX-SS	4-6	PAGZZ
16FTX-S	4-6-5	PAGZZ
3719AS100-1	4-6	PAGGG
3719AS102-1	4-6-21	PAGZZ
3719AS104-1	4-6	PAGGG
3719AS104-2	4-6	PAGGG
3719AS105-1	4-6	PAGGG
3719AS105-2	4-6	PAGGG
3719AS106-1	4-6-14	PAGGG
3719AS107-1	4-6-1	PAGGG
3719AS108-1	4-6-41	PAGZZ
4090-5202	4-6-19	PAGZZ
4150-5178	4-6-22	PAGZZ
5033K35	4-6-29	PAGZZ
	4-6-32	PAGZZ
	4-6-37	PAGZZ
	4-6-40	PAGZZ
6534K43	4-6-6	PAGZZ
6780-5005	4-6-20	PAGZZ
6XHX7-SS	4-6-42	PAGZZ
8-4-HTX-SS	4-6	PAGZZ
8-5-HTX-SS	4-6	PAGZZ
8-6-HTX-SS	4-6	PAGZZ
8-HTX-SS	4-6	PAGZZ
94805A233	4-7-2	PAGZZ

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CHAPTER 5

FULL-FACE OXYGEN AND SMOKE MASK

TYPE MIL-M-19417B

Section 5-1. Description

5-1. GENERAL.

5-2. The Full-Face Oxygen and Smoke Mask, Type MIL-M-19417B (figure 5-1) is designed to dispense gaseous oxygen from a demand type regulator to the aircrewman. In addition, the mask provides protection from smoke, carbon monoxide or other incapacitating gasses.

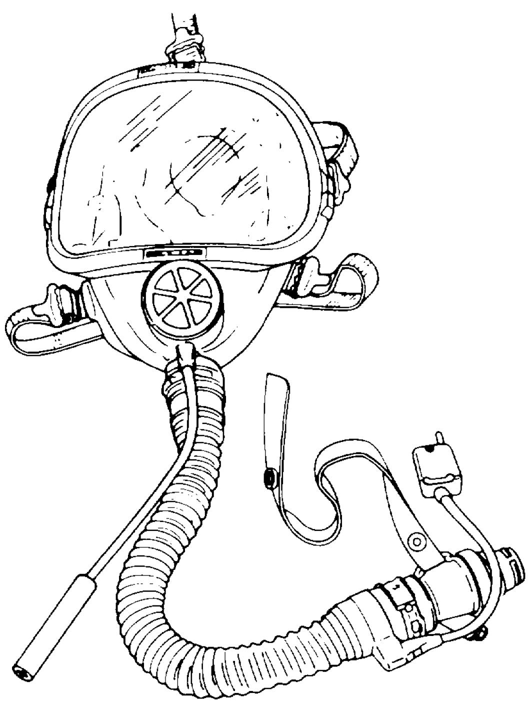

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Figure 5-1. Full-Face Oxygen and Smoke Mask (MIL-M-19417B)

5-3. The Full-Face Oxygen and Smoke Mask consists of a molded rubber facepiece with microphone cavity, allyl plastic lens, exhalation valve, molded rubber headstrap assembly, delivery hose with communication lead and an MC-3A type connector. The mask is supplied in one size. Fitting is accomplished by adjusting the five adjustable head straps. The mask may be worn with earphones, or with a protective helmet.

5-4. CONFIGURATION.

5-5. The single configuration of the Full-Face Oxygen and Smoke Mask consists of the facepiece, delivery hose and MC-3A connector. The delivery hose (K-4 hard hose) is composed of nonstretch, nonkinking, smooth bore, flexible hose with an integral corrosion resistant wire. The hose cover is knitted or braided of tubular polyamide or polyester. The communication cable is molded into the hose with leads extending for attachment for a mask mounted microphone and a connection for attaching to the aircraft communications system. The MC-3A connector is provided for access to the aircraft oxygen system.

5-6. FUNCTION.

5-7. When connected to the aircraft system, oxygen flows from the system through the MC-3A connector and into the delivery hose, through the inlet port and enters the mask through two inlet ducts at the bottom of the facepiece lens. These ducts also act as a defogger for the lens. Exhalation is accomplished through an exhalation valve located at the front of the mask below the lens. The exhalation valve consists of a plastic housing with a rubber flapper valve.

5-8. SERVICE LIFE.

5-9. Service life of the Full-Face Oxygen and Smoke Mask as established by the cognizant engineering activity is indefinite. The mask is considered serviceable if it meets periodic inspection requirements.

Section 5-2. Modifications

5-10. GENERAL.

5-11. No modifications are required or authorized for this mask.

Section 5-3. Maintenance

5-12. GENERAL.

5-13. This section contains procedural steps for disassembly, cleaning, inspection, assembly, functional testing, sanitizing, and storage. All work shall be performed in a clean, dust-free area.

NOTE

Upon completion of any maintenance action (e.g. inspection, repair, modification, etc.), be sure to complete the required Maintenance Data Collection System forms.

5-14. INSPECTION.

5-15. PREFLIGHT INSPECTION. The Preflight Inspection consists of a Visual Inspection and Functional Test performed before each flight by the aircrewmember by whom the mask is to be used. Perform the inspection as follows:

1. Examine mask and hose for deterioration, abrasion, cracks, cuts, and security of attachment of mask-to-hose and hose-to-connector.

2. Examine facepiece lens for cracks, excessive scratches.

3. Check mask and communications system for proper operation.

4. Perform Functional Test (paragraph 5-22).

5. If malfunctions are found or suspected, return mask to Aviator's Equipment Branch for corrective action.

5-16. ACCEPTANCE/SPECIAL INSPECTION. The Acceptance/Special Inspection consists of a Visual Inspection followed by a Functional Test. This inspection and test shall be performed in conjunction with the aircraft inspection requirements for the aircraft in which the masks are installed. To perform the inspection, proceed as follows:

1. Visually inspect the mask in accordance with paragraph 5-20.

2. Functionally test the mask in accordance with paragraph 5-22.

3. Sanitize the mask in accordance with paragraph 5-23.

NOTE

Step 4 is performed only on a new mask or during an Acceptance Inspection.

4. Assemble the mask in accordance with paragraph 5-21.

5-17. CALENDAR/PHASE/SDLM INSPECTION. A Calendar/Phase/SDLM Inspection shall be performed upon issue and in accordance with the Planned Maintenance System (PMS) of the aircraft (see PMS publications for specific interval). The Calendar/Phase/SDLM Inspection consists of the following:

1. Disassembly (paragraph 5-18).
2. Cleaning (paragraph 5-19).
3. Visual Inspection (paragraph 5-20).
4. Assembly (paragraph 5-21).
5. Functional Test (paragraph 5-22).
6. Sanitizing (paragraph 5-23).

5-18. Disassembly. To disassemble the Full-Face Oxygen and Smoke Mask proceed as follows:

NOTE

Refer to figure 5-2 for parts identification.

1. Remove lens (4) to prevent scratching during disassembly.

2. Remove retaining ring (13) and disconnect microphone leads. Remove microphone (16).

CAUTION

To prevent damage to mask material, do not use mechanical assist (screwdriver) when removing oxygen delivery hose (8).

NOTE

Remove oxygen hose clamps (10 and 11) by lifting clamp securing tab off securing teeth with small straight screwdriver.

3. Loosen hose clamps (10 and 11) and remove hose and microphone lead. Remove connector from opposite end of oxygen delivery hose (8).

4. Remove exhalation valve assembly and disassemble, if necessary.

5-19. Cleaning. To clean the Full-Face Oxygen and Smoke Mask, prepare either of the following cleaning solutions using warm potable water. Quantities are sufficient to clean a minimum of 10 masks.

Materials Required

Quantity	Description	Reference Number
As Required	Cloth, Lint-free, Type II	MIL-C-85043
As Required	Detergent, General Purpose, Type I	MIL-D-16791
	or	
As Required	Soap, Laundry, Low-filter	P-S-600
As Required	Swab, Cotton	—

Support Equipment Required

Quantity	Description	Reference Number
1	Brush, Soft Bristle	—
1	Brush, Test Tube, Dia. 1 1/2 Inches	—

NOTE

The detergent solution is preferred since there is no risk of contamination due to undissolved soap powder residue.

1. DETERGENT SOLUTION. Make a 1-percent by weight solution of cleaning compound (Detergent, General Purpose) by adding 1/5 to 1/2 ounce (liquid) of the compound to one gallon of water.

NOTE

If it is necessary that the soap powder solution be used, agitate solution and use only the lather to clean the mask.

2. SOAP POWDER SOLUTION. Make a suitable soap solution by adding approximately 4 tablespoons of soap powder to one gallon of water. Hardness of water may require more soap but the solution must be sufficiently strong to readily form lather when agitated. Make sure that all soap particles are dissolved.

WARNING

Do not use alcohol in any form to clean masks. Do not use any flammable solvents or liquid toxicants for cleaning.

CAUTION

When the substitute solution is used, use only the lather from the solution for cleaning. This will prevent undissolved soap powder from getting into exhalation valve.

3. Using the preferred formula, if possible (if a soap must be used as the cleaning medium, use only the lather). Wash exhalation valve. Grasp the valve by gently pinching the flap portion between thumb and index finger. This will expose the underside of the flap and the valve seat for cleaning. Use a soft brush to clean the entire valve, paying special attention to the valve seat recess and the valve recess. Apply only moderate pressure when cleaning as the flap may be damaged. Rinse all parts in clean, potable cold water.

4. Wash external and internal surfaces of the mask thoroughly. A test tube brush approximately 1-1/2 inches in diameter can be used to clean the interiors of the inlet tube and the inhalation ports. A soft brush can also be used to an advantage in cleaning mask surfaces. After all surfaces have been wiped or brushed, submerge entire mask in cleaning solution and agitate thoroughly. Rinse in clean, potable cold water and shake off excess.

5. Clean mask microphone by wiping with a swab of soft, clean cloth lightly dampened in cleaning solution and rinse with a second swab lightly dampened in clean, potable cold water. Make sure no lint remains on microphone.

6. A dry swab can be used to assist in drying the washed items. Be careful that lint is not trapped in valves or mask crevices. Air-dry in a ventilated area out of direct sunlight.

CAUTION

The mask may be forced-air dried using a stream of clean, dried, oil-free air or nitrogen. Make sure that parts are completely dry before reassembling mask. Do not use compressed gas for drying exhalation valve or microphone.

7. Examine mask, hose, and exhalation valve for presence of undissolved soap powder. Ensure that all parts are completely dry and lint free.

5-20. Visual Inspection. To visually inspect the Full-Face Oxygen and Smoke Mask, examine the following:

NOTE

Repair of the Full-Face Oxygen and Smoke Mask shall be limited to parts replacement. Any hole or tear that occurs in any component is basis for rejection of that component.

1. Mask for deterioration; material imperfections; embedded foreign matter; dirty, rough, misaligned, cracked, nicked or otherwise flawed surface; any component loose or not properly attached. Replace defective components or mask assembly.

2. Exhalation valve for nicks, grooves, scratches, or any other damage affecting sealing action. If valve is defective, replace mask assembly.

3. Headstraps for fraying, deterioration, or cuts. Hardware for corrosion or other damage. Replace defective components.

4. Delivery hose for deterioration, cuts, abrasion, creased or flat spots. Replace defective hose.

5. Communications cable/microphone for electrical continuity and proper operation. Replace defective components.

6. Ensure that mask assembly meets requirements of paragraph 5-21.

5-21. Assembly. To assemble mask, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Adhesive	MMM-A-121 NIIN 00-165-8614
1	Brush, Acid	NIIN-00-514-2417

Support Equipment Required

Quantity	Description	Reference Number
1	Pliers, Miniature Channel Lock	—
1	Pliers, Retaining Ring	—

NOTE

Refer to figure 5-2 for part identification.

1. Install exhalation valve assembly.

a. Using an acid brush, apply a thin coat of adhesive to the outer surface of the exhalation valve, taking care not to get the adhesive on or into the internal parts of the exhalation valve.

b. Using an acid brush, apply a thin coat of adhesive to the inner walls of the exhalation valve cover.

c. Allow the adhesive to dry on both surfaces, then install the exhalation valve cover onto the exhalation valve.

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2. Install insert (9) in oxygen delivery hose (8) and connect oxygen delivery hose (8) to mask. Tighten hose clamp (10) using miniature channel lock pliers until snug fit is attained.

3. Insert microphone lead through lead inlet port, making sure that molded rubber cable end fits snugly into inlet port.

4. Connect microphone (16) to microphone lead and install microphone base into microphone housing. Secure with retaining ring (13).

NOTE

To prevent damage, use retaining ring pliers when installing retaining ring (13).

5. Install MC-3A connector in oxygen delivery hose (8) end and secure hose clamp (11) with miniature channel lock pliers. Tighten until snug.

6. To preclude a possible flight safety hazard in the event a hose clamp loosens, thus compromising the effectiveness of the connection, inspect and test connection at preflight and whenever assemblies containing connections are drawn from supply. Perform inspection and test as follows:

CAUTION

Care must be taken in the performance of this operation as an overtightening of the clamp may lead to pleating of the mask at the hose attachment point and eventual mask failure due to tearing of the material.

a. Grasp connection on both sides of hose clamp.

b. Jerk connection sharply to ensure that clamp has been tightened sufficiently.

c. If connection comes loose, reassemble connection in proper position, tighten hose clamp, and ensure that connection has been sufficiently tightened in accordance with steps a and b.

7. Install lens (4) on facepiece (15) and secure with lens retainer frame assembly (1).

8. Examine mask for proper assembly.

5-22. Mask Functional Test. To test the mask after inspection, proceed as follows:

1. Plug inlet end of connector assembly by any suitable method.

2. Holding mask close to face, but not sealed to face, inhale deeply. Then press mask firmly to face, forming a tight seal, and exhale forcibly. If the exhalation valve is operating properly, the exhalation will be smooth and with minimum resistance.

3. Affix mask assembly to face, adjusting straps for a snug, comfortable, leak-tight fit. With inlet end of hose assembly blocked, inhale sharply and deeply and hold inhalation (keep inhaling) as long as possible. If there is no leakage through mask hose, fittings, or exhalation valve, and as soon as all residual air in mask and hose has been inhaled, further inhalation will be impossible.

4. Obtain assistance from Avionics Branch to ensure proper continuity of communications leads.

5-23. Sanitizing Masks. Masks not on a personal issue basis shall be sanitized after each use as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Benzalkonium Chloride Solution	MIL-B-37451
As Required	Pad, Gauze	—
As Required	Sani Com 3205	NIIN 01-299-5061

NOTE

Pour benzalkonium chloride solution into a container sufficient to sanitize at least 10 masks.

1. Moisten a gauze pad with solution, squeeze to prevent dripping, and wipe interior of mask, exclusive of valves and microphone. Ensure that sanitizing solution penetrates all crevices.

2. Wipe valves and microphones with a clean, dry cloth. Ensure that no lint remains in mask, on valves, or on microphone.

NOTE

If benzalkonium chloride solution is not available, Sani Com 3205 can be used.

5-24. After sanitizing, place mask in a clean approved bag. If the mask is not to be put into immediate service, store in accordance with paragraph 5-25.

5-25. MASK STORAGE.

5-26. After using a personal issue mask, wipe it clean and store it in a clean, approved plastic bag or any other suitable container that will keep the mask clean, dry and lint-free. Masks not used on a personal-issue basis are to be sanitized before storage. Stored masks must have ample ventilation and not be exposed to excessive heat or direct sunlight. The mask is not to be stored in an area where other flight gear will be stored on top of it.

Section 5-4. Illustrated Parts Breakdown

5-27. GENERAL.

5-28. This Section lists and illustrates the procurable parts of the Full-Face Oxygen and Smoke Mask (MIL-M-19417B).

5-29. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

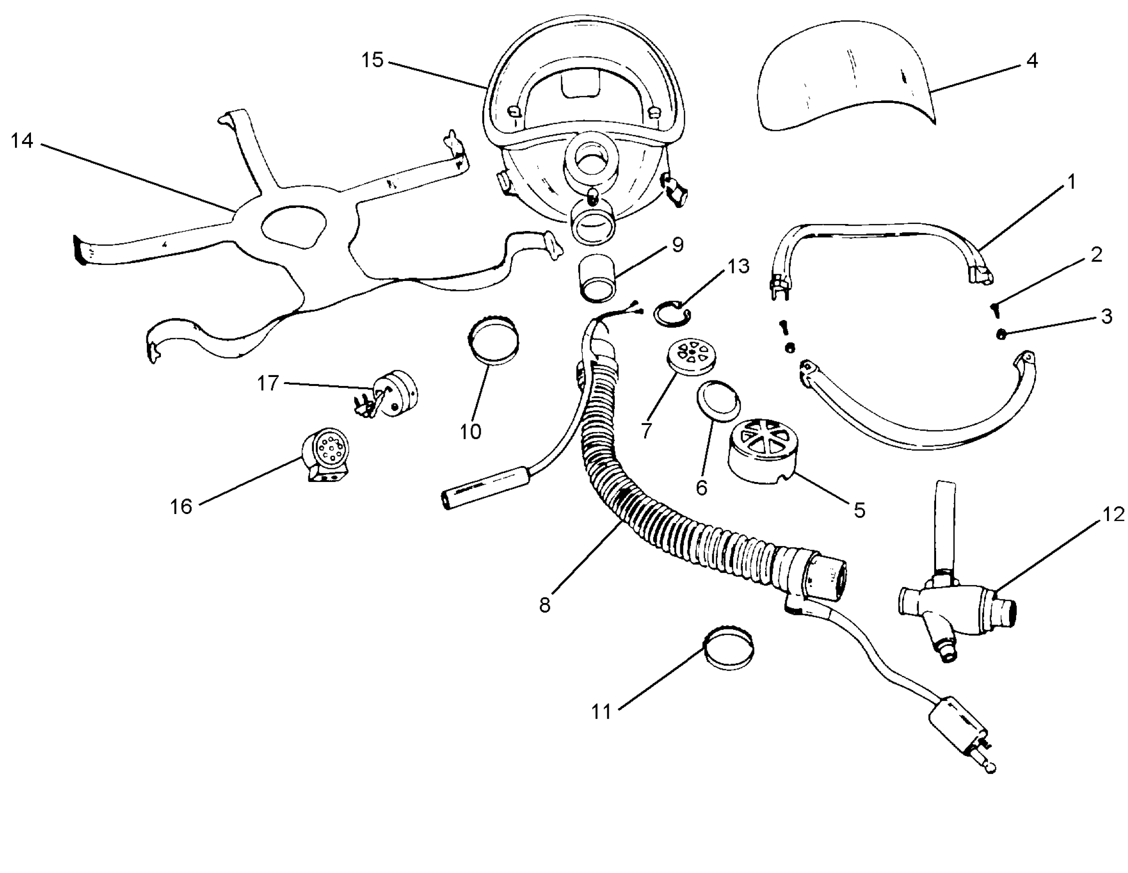

Figure 5-2. Full-Face Oxygen and Smoke Mask Assembly (MIL-M-19417B), IPB

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
5-2	651-01B	MASK ASSEMBLY, Oxygen and Smoke, Full-Face (MIL-M-19417B) (CAGE 92114)	Ref	
-1	651-04	. FRAME ASSEMBLY, Lens retainer	1	
		(ATTACHING PARTS)		
-2	00-19	. SCREW, Machine	2	
-3	00-2339	. NUT, Self-locking	2	
		---*---		
-4	651-03	. LENS	1	
	651-126-1	. VALVE ASSEMBLY, Exhalation	1	
-5	651-16	. . COVER, Valve	1	
-6	651-19	. . FLAP, Valve	1	
-7	651-18-3	. . SEAT, Valve	1	
-8	MS90339-3	. HOSE ASSEMBLY, Oxygen delivery	1	
-9	651-05	. INSERT	1	
-10	NAS397-24	. CLAMP, Hose	1	
-11	MS22064-5	. CLAMP, Hose	1	
-12	MS22016	. CONNECTOR ASSEMBLY, Type MC-3A	1	
-13	00-2398	. RING, Retainer	1	
-14	651-02-3	. HARNESS, Mask	1	
-15	651-11-3	. FACEPIECE, Mask	1	
-16	M-101/AIC	. MICROPHONE ELEMENT (Dynamic)	1	
-17	AM4326BA	. AMPLIFIER (CAGE 80058) (P/N D525B200) (CAGE 19610) (MIL-A-23595A)	1	

NUMERICAL INDEX

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CHAPTER 6

QUICK-DONNING OXYGEN MASK ASSEMBLY

TYPE MBU-10/P

Section 6-1. Description

6-1. GENERAL.

6-2. This chapter contains maintenance and test procedures for the Quick-Donning Oxygen Mask Assembly, Type MBU-10/P, (P/N 358-1501) (manufactured by Scott Aviation Co. CAGE 92114) (figure 6-1).

6-3. The Oxygen Mask Assembly consists of a hanging suspension holder, a suspension assembly, an oxygen mask assembly, a cable and plug assembly and a dust cover. The oxygen mask assembly is supplied in one size (regular).

6-4. CONFIGURATION.

6-5. The single configuration of the Quick-Donning Oxygen Mask Assembly consists of a hanging suspension holder which is mounted in the aircraft to facilitate stowage, a suspension assembly which incorporates a bracket assembly, cushions, straps, retention assemblies, and yoke assembly (the electrical switching mechanism is located in the yoke assembly), an oxygen mask assembly which is of a hard shell and molded rubber construction that incorporates the microphone, valve assembly, cord and snap assembly, connector, hose, cable guides, and clamps, and a cable and plug assembly.

6-6. FUNCTION.

6-7. The Quick-Donning Oxygen Mask Assembly permits the aircrewmember to breathe gaseous oxygen. Oxygen supply enters the facepiece through the valve located at the bottom of the mask. Exhaled air passes out through the same valve. The exhalation portion of the valve is constructed so that only a pressure of one millimeter of mercury greater than the inlet pressure being supplied by the regulator, will force open the valve and allow exhaled air to flow from the mask. The mask also provides automatic electrical switching from the headset microphone to the oxygen mask microphone. This feature permits the aircrewmember while wearing the mask to transmit the same as with the headset microphone, without the need to unplug the headset microphone and then plug in the oxygen mask microphone.

6-8. DONNING PROCEDURES.

6-9. The Oxygen Mask Assembly Quick-Donning feature permits extremely rapid removal from stowage and donning with one hand in the event of an emergency. Remove the mask assembly from the suspension holder by firmly grasping the mask assembly. With the hand placed around the yoke tab, pull down and away from the hanging suspension holder. Place the mask assembly over the head until the nape pad of the suspension assembly contacts the base of the skull (figure 6-2). Pull mask assembly forward and down, causing automatic unfolding of the suspension assembly, until it rests comfortably on the face (figure 6-2). Microphone switching is automatically accomplished when the mask is unfolded.

6-10. SUSPENSION ASSEMBLY ADJUSTMENT.

6-11. To adjust the suspension assembly proceed as follows:

1. If the suspension assembly is too loose, tighten top adjustment strap until proper fit is obtained.

2. If the suspension assembly is too tight, loosen top adjustment strap assembly until proper fit is obtained.

6-12. SERVICE LIFE.

6-13. Service life for the Quick-Donning Oxygen Mask assembly, as established by the cognizant engineering activity, is indefinite. The mask is considered serviceable if it meets periodic inspection requirements.

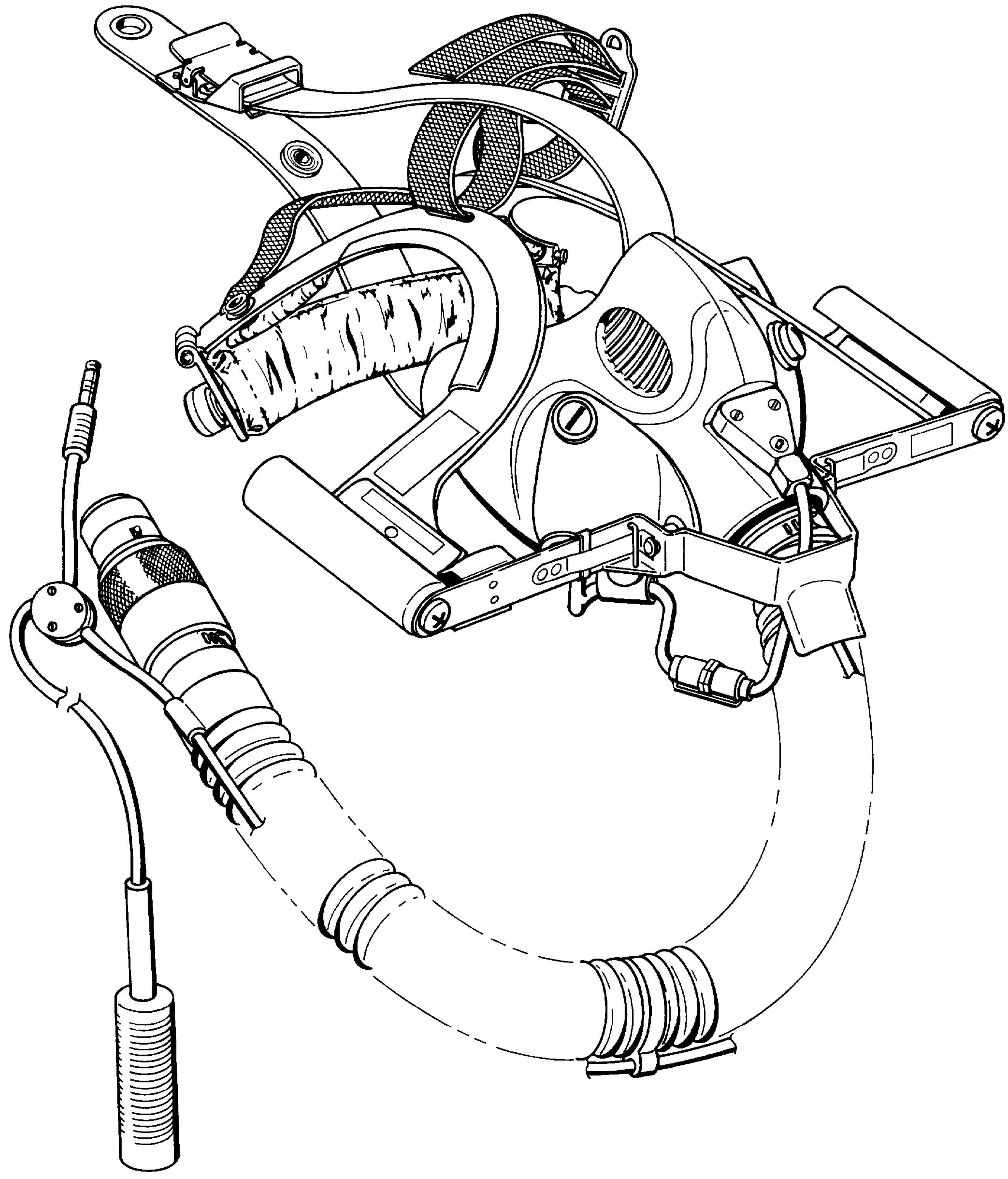
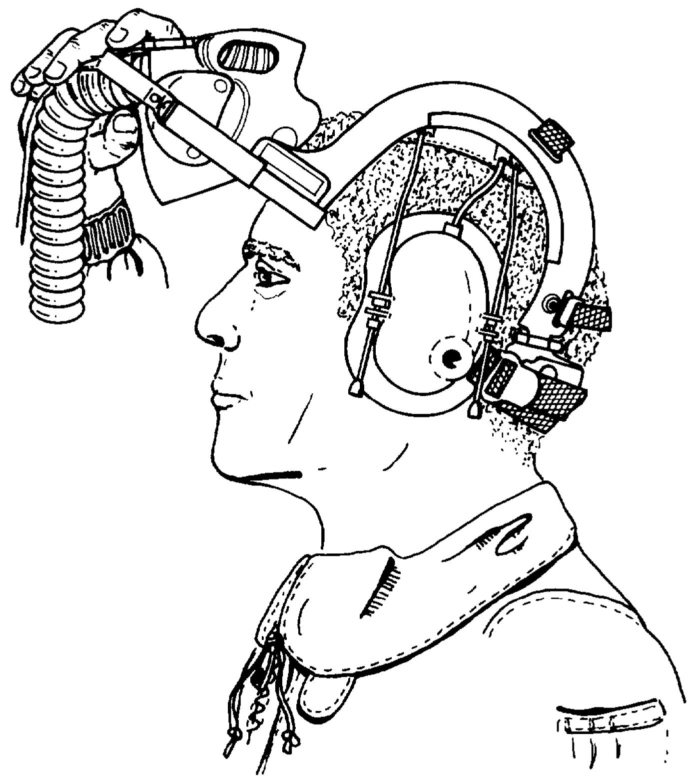


Figure 6-1. MBU-10/P Oxygen Mask



STEP 1. STARTING POSITION

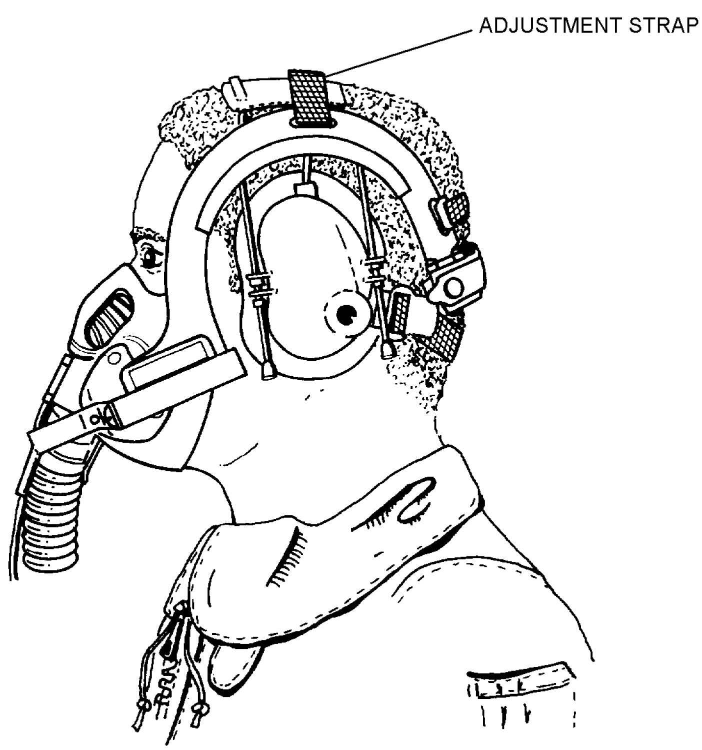


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Figure 6-2. Donning Procedure

Section 6-2. Modifications

6-14. GENERAL.

6-15. No modifications are required or authorized for the Quick-Donning Oxygen Mask Assembly.

Section 6-3. Maintenance

6-16. GENERAL.

6-17. This section contains procedural steps for disassembly, cleaning, inspection, assembly, functional testing, sanitizing and stowage. All work shall be performed in a clean, dust-free area.

NOTE

Upon completion of any maintenance action (e.g., inspection, repair, modification, etc.) be sure to complete the required Maintenance Data Collection System Forms.

6-18. INSPECTION.

6-19. PREFLIGHT INSPECTION. The Preflight Inspection consists of a Visual Inspection and Functional Test performed before each flight by the aircrewmember by whom the mask is to be used. Perform the inspection as follows:

1. Examine mask and hose for deterioration, abrasion, cracks, cuts, and security of attachment of mask-to-hose.

2. Inspect bracket and pad assembly for dents, bends, corrosion, deterioration and fraying of adjustment strap, and other obvious damage.

3. Inspect headset and microphone for cracks, damaged wiring, corrosion, and other obvious damage.

4. Examine cleanliness of entire mask assembly.

NOTE

If malfunctions are found or suspected, return mask assembly to aviator's equipment branch for corrective action.

6-20. ACCEPTANCE/SPECIAL INSPECTION. The Acceptance/Special Inspection consists of a Visual Inspection followed by a Functional Test. This inspection and test shall be performed in conjunction with the aircraft inspection requirements for the aircraft in which the mask assembly is installed. To perform the inspection, proceed as follows:

1. Visually inspect the mask assembly in accordance with paragraph 6-24.

2. Functionally test the mask assembly in accordance with paragraph 6-26.

3. Sanitize the mask in accordance with paragraph 6-27.

6-21. CALENDAR/PHASE/SDLM INSPECTION. A Calendar/Phase/SDLM inspection shall be performed upon issue and in accordance with the Planned Maintenance System (PMS) of the aircraft (see PMS publications for specific interval). The Calendar/Phase/SDLM Inspection consists of the following:

1. Disassembly (paragraph 6-22).

2. Cleaning (paragraph 6-23).

3. Visual Inspection (paragraph 6-24).

4. Assembly (paragraph 6-25).

5. Functional Test (paragraph 6-26).

6. Sanitizing (paragraph 6-27).

6-22. Disassembly. To disassemble Quick-Donning Oxygen Mask Assembly, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Elastrator	00-6276 (CAGE 92114)
1	Hose Clamp Pliers	450-813 (CAGE 92114)
1	Wrench	211-838 (CAGE 92114)

NOTE

Refer to figure 6-4 for index numbers during disassembly.

CAUTION

To prevent damage to mask material, do not use mechanical assist (screwdriver) when removing delivery hose.

1. Unclip pull the dot snap and unplug switch, cable and plug assembly (1) from microphone cable assembly (2).

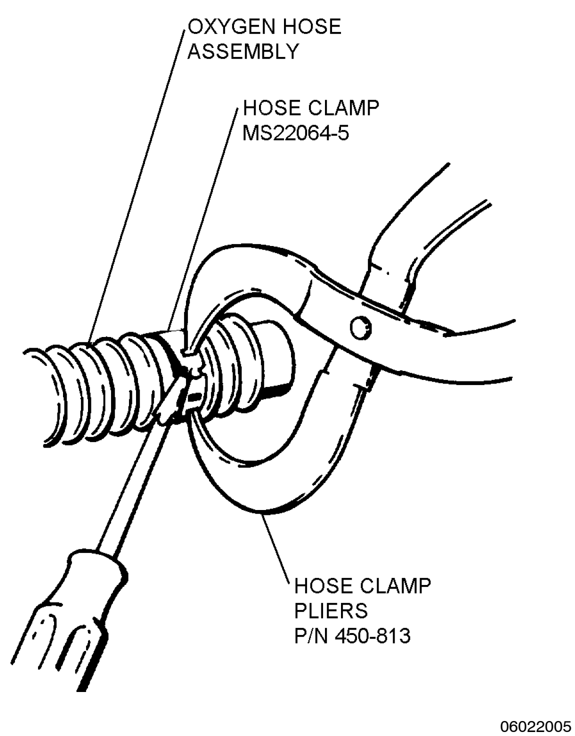
2. Depress two clips and remove bracket and pad assembly (3) from hard shell adapter (4).

3. Remove hard shell adapter (4) from facepiece (8) by removing four tee nuts (5), four nylon washers (6) and four screws (7).

4. Depress red button on microphone connector assembly (13) and unplug microphone cable assembly (2).

5. Disconnect hose assembly (9) from oxygen valve (18) by removing upper clamp (10) and untying cord (11).

6. Remove oxygen hose connector (12) from oxygen hose (9) by removing lower clamp (10) and unclipping cord (11).



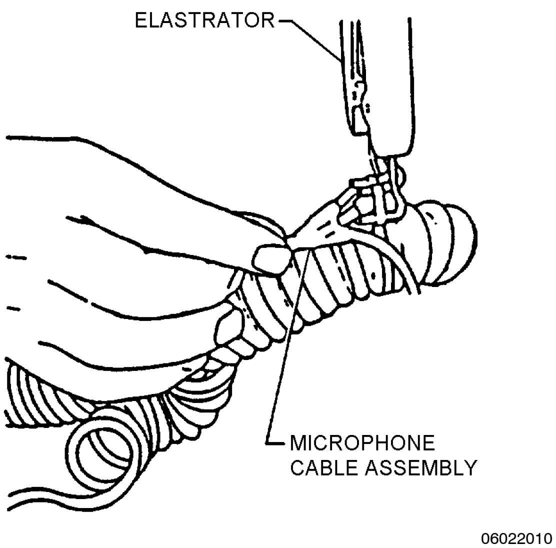
Steps 5 and 6 - Para 6-22

7. Remove microphone connector assembly (13), microphone bracket (16) and microphone assembly (15) from facepiece (8) by removing two screws (14).

8. Remove oxygen valve (18), sealing washer (19), sealing washer (20), cap bearing (21) and valve nut (22) from facepiece (8) using wrench (P/N 211-838).

9. Remove microphone assembly (15) from microphone bracket (16) by removing two screws (17) and unplugging.

10. Remove microphone cable assembly (2) from oxygen hose (9) by stretching open upper cable guide (23) with an elastrator, then repeat with center cable guide (23) and lower cable guide (24).



Step 10 - Para 6-22

6-23. Cleaning. Masks not on a personal issue basis shall be cleaned after each use and during the Calendar/Phase Inspection. To clean the mask, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Benzalkonium Chloride Solution	MIL-B-37451
As Required	Cloth, Lint-Free, Type II	MIL-C-85043
As Required	Cotton Swabs	—

Materials Required (Cont)

Quantity	Description	Reference Number
As Required	Detergent, General Purpose Type I	MIL-D-16791
	or	
As Required	Soap, Laundry Low-filter	P-S-600
As Required	Isopropyl Alcohol	TT-A-735A

Support Equipment Required

Quantity	Description	Reference Number
1	Brush, Soft Bristle	—

NOTE

The detergent solution is preferred since there is no risk of contamination due to undissolved soap powder residue.

1. DETERGENT SOLUTION. Make a 1-percent by weight solution of cleaning compound (Detergent, General Purpose) by adding 1/4 to 1/2 ounce (liquid) of the compound to one gallon of water.

NOTE

If it is necessary that the soap powder solution be used, agitate solution and use only the lather to clean the mask.

2. SOAP POWDER SOLUTION. Make a suitable soap solution by adding approximately 4 tablespoons of soap powder to one gallon of water. Hardness of water may require more soap but the solution must be sufficiently strong to readily form lather when agitated. Make sure that all soap particles are dissolved.

WARNING

Do not use alcohol in any form to clean masks. Do not use any flammable solvents or liquid toxicants for cleaning.

3. Using a soft bristle brush, apply cleaning solution to mask and oxygen hose. After application of cleaning solution to mask and delivery hose, submerge entire mask and delivery hose in cleaning solution and agitate thoroughly. Rinse in clean, potable cold water and shake off excess.

4. Clean all O-rings and rubber gaskets using same procedures in step 3.

5. To clean the inhalation/exhalation oxygen valve, proceed as follows:

CAUTION

The inhalation/exhalation valve must be removed from mask before cleaning. Isopropyl alcohol must not come in contact with the oxygen mask.

a. Obtain a small container large enough to partially submerge the oxygen valve.

NOTE

If a 70% solution of isopropyl alcohol is not available, mix 3 parts water and 7 parts isopropyl alcohol.

b. Fill container half full with benzalkonium chloride solution or a 70% solution of isopropyl alcohol.

CAUTION

Do not submerge the oxygen valve in water. Do not probe any portion of the valve.

c. Hold base portion of valve; submerge in partially filled container, and wash operating portion of valve in alcohol solution. Normally only a few seconds are required to remove stains and residue.

d. Use a cotton swab saturated in benzalkonium chloride solution or isopropyl alcohol to remove stubborn residue. LIGHTLY rub only exhalation plate.

e. Gently shake excess solution from oxygen valve and allow to air-dry completely.

NOTE

Trapped isopropyl alcohol will evaporate in approximately 15 minutes.

6. To clean the microphone, proceed as follows:

a. Wipe microphone with a cotton swab or soft, clean cloth dampened lightly in cleaning solution.

b. Rinse with a second cotton swab dampened lightly in clean, potable cold water. Make sure no lint remains on microphone.

CAUTION

Do not use compressed gas for drying as valves may be damaged.

7. A dry swab can be used to assist in drying washed items. Be careful that lint is not trapped in valves or mask crevices. Air-dry in a ventilated area out of direct sunlight. The mask and delivery hose may be forced-air dried using a stream of clean, dried, oil-free air or nitrogen. Make sure that parts are completely dry before reassembling mask.

NOTE

Examine valves, mask, and hose for undissolved soap powder. Ensure that mask and valves are completely dry and lint-free.

6-24. Visual Inspection. To visually inspect the Quick-Donning Oxygen Mask Assembly examine the following:

NOTE

Repair of the Quick-Donning Oxygen Mask Assembly shall be limited to parts replacement. Any hole or tear that occurs in any component is basis for rejection of that component.

1. Mask for deterioration; material imperfections embedded foreign matter; dirty, rough, misaligned, cracked, nicked or otherwise flawed surface; any component loose or not properly attached. Replace defective components or mask assembly.

2. Exhalation/inhalation valve for nicks, grooves, scratches, or any other damage affecting sealing action. If valve is defective, replace the valve.

3. Headstraps/suspension assembly for fraying, deterioration, or cuts. Hardware for corrosion or other damage. Replace defective components.

4. Delivery hose for deterioration, cuts, abrasion creased or flat spots. Replace defective hose.

5. Communications cable/microphone for electrical continuity and proper operation. Replace defective components.

6-25. Assembly. To assemble the Quick-Donning Oxygen Mask Assembly, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Elastrator	00-6276 (CAGE 92114)
1	Hose Clamp Pliers	450-813 (CAGE 92114)
1	Nylon Cord Attachment Hook	Fabricate IAW figure 6-3
1	Wrench	211-838 (CAGE 92114)

NOTE

Refer to figure 6-4 for index numbers during assembly.

1. Insert sealing washer (19) on oxygen valve (18) and install oxygen valve (18) on to facepiece (8).

2. Hold oxygen valve (18) in place, install sealing washer (20), cap bearing (21) and valve nut (22).

3. Tighten valve nut (22) by hand then tighten with wrench.

4. Plug microphone assembly (15) into microphone bracket (16) and secure with two screws (17).

5. Install microphone connector assembly (13), microphone assembly (15), and microphone bracket (16) into facepiece (8) and secure with two screws (14).

NOTE

Locally manufacture nylon attachment hook out of steel wire 1/16 inch in diameter for attaching nylon cord to oxygen valve (figure 6-3).

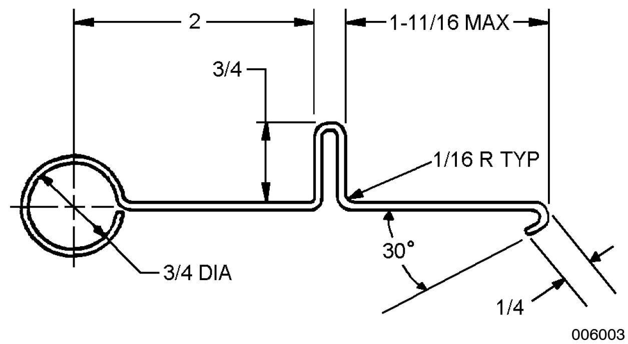
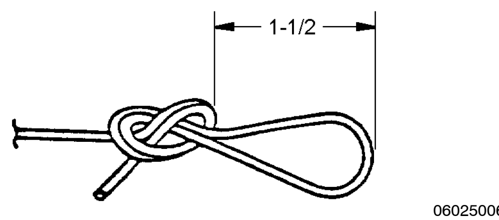


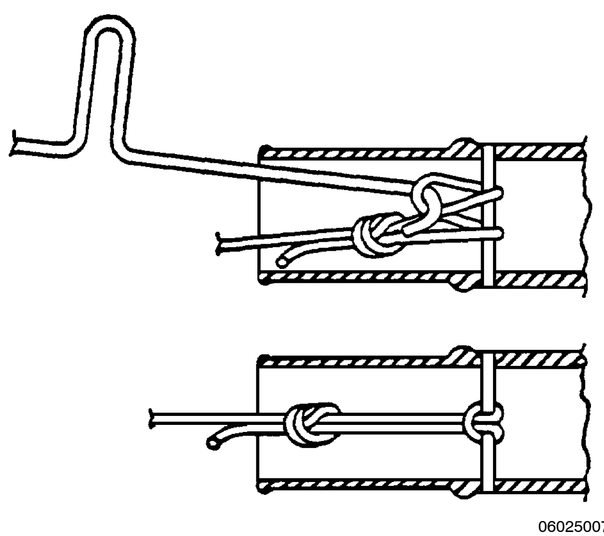
Figure 6-3. Nylon Cord Attachment Hook

6. Take the nylon cord and form a 1-1/2 inch loop and secure with a bowline knot.



Step 6 - Para 6-25

7. Using nylon cord attachment hook, secure nylon cord to oxygen valve (18) with a larks head knot.



Step 7 - Para 6-25

8. Route nylon cord (11) through hose assembly (9). Attach hose assembly (9) to oxygen valve (18) and secure with upper hose clamp (10) using hose clamp pliers.

9. Clip nylon cord (11) to oxygen hose connector (12). Attach oxygen hose connector (12) to hose assembly (9) and secure with bottom hose clamp (10) using hose clamp pliers.

10. Jerk hose sharply at mask facepiece and oxygen hose connector (12) to ensure securing of attachment.

CAUTION

Do not overexpand cable guides with elastrator. Open only enough to pass cable assembly through opening.

11. Using elastrator spread cable guides (24) and (23) and route microphone cable assembly (2) through cable guide (24) and two cable guides (23).

12. Attach adapter (4) to facepiece (8) and secure with four tee nuts (5), four nylon washers (6) and four screws (7).

13. Clip bracket and pad assembly (3) to adapter (4).

14. Plug microphone cable (2) into microphone connector (13) and switch, cable and plug assembly (1).

15. Attach switch, cable and plug assembly (1) with pull the dot snap to adapter (4).

6-26. Mask Functional Test. To test the mask after inspection, proceed as follows:

1. Plug inlet end of connector assembly by any suitable method.

2. Holding mask close to face, but not sealed to face, inhale deeply. Then press mask firmly to face, forming a tight seal, and exhale forcibly. If the exhalation valve is operating properly, the exhalation with be smooth and with minimum resistance.

3. Affix mask assembly to face, adjusting straps for a snug, comfortable, leak-tight fit. With inlet end of hose assembly blocked, inhale sharply and deeply and hold inhalation (keep inhaling) as long as possible. If there is no leakage through mask hose, fittings, or exhalation valve, and as soon as all residual air in mask and hose has been inhaled, further inhalation with be impossible.

4. Obtain assistance from Avionics Branch to ensure proper continuity of communications leads.

6-27. Sanitizing Masks. Masks not on a personal-issue basis shall be sanitized after each use as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Cloth, Lint-Free, Type II	MIL-C-85043
As Required	Pad, Gauze	—
As Required	Sanitizing Solution, Thimerosal	NIIN 00-128-5695
As Required	Spray SBT-12, Antiseptic, Aersol	—

NOTE

One-quarter pint of Thimerosal, as issued, is sufficient to sanitize at least 10 masks.

1. Moisten a gauze pad with solution, squeeze to prevent dripping, and wipe interior of mask, exclusive of valves and microphone. Ensure that sanitizing solution penetrates all crevices.

2. Wipe valves and microphone with a clean, dry cloth. Ensure that no lint remains in mask, on valves, or on microphone.

NOTE

If Thimerosal is not available, an alternate sanitizer, Aerosol Antiseptic Spray SBT-12 (dibromosalicyl bromanicide), manufactured by Lever Brothers, Inc., can be used. Directions for use are indicated on the container.

6-28. After sanitizing, place dust cover over facepiece and attach suspension strap to bracket and pad assembly. If mask assembly is not to placed in immediate service, store in accordance with paragraph 6-29.

6-29. MASK STORAGE.

6-30. Masks not used on a personal-issue basis are to be sanitized before storage. Place the mask assembly in a plastic bag or any other suitable container that will keep the mask clean, dry, and lint-free. Stored masks must have ample ventilation and not be exposed to excessive heat or direct sunlight. The masks are not to be stored in an area where other flight gear will be stored on top of them.

Section 6-4. Illustrated Parts Breakdown

6-31. GENERAL.

6-32. This Section lists and illustrates the procurable parts of the Quick-Donning Oxygen Mask Assembly, Type MBU-10/P.

6-33. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

Figure 6-4. MBU-10/P Oxygen Mask Assembly, IPB

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-4	358-1501-1	OXYGEN MASK ASSEMBLY, MBU-10/P	REF	A
-1	358-1355-1	. SWITCH, CABLE, AND PLUG .... ASSEMBLY	1	
-2	358-1358	. MICROPHONE CABLE, ASSEMBLY	1	
-3	358-1306	. BRACKET AND PAD ASSEMBLY	1	
-4	358-1522	. ADAPTER	1	
-5	834-12	. TEE NUT	4	
-6	00-4607-1	. WASHER, Nylon	4	
-7	AB2662V3N	. SCREW	4	
-8	834-26-2	. FACEPIECE	1	
-9	834-18	. HOSE	1	
-10	MS22064-5	. CLAMP, Hose	2	
-11	339-06-1	. CORD AND SNAP ASSEMBLY	1	
-12	232-94A	. CONNECTOR, Hose Assembly	1	
-13	834-37	. CONNECTOR ASSEMBLY, ... Microphone	1	
-14	MS35276-209	. SCREW	2	
-15	M-101/AIC	. MICROPHONE ASSEMBLY	1	
		ATTACHING PARTS		
-16	00-6268	. BRACKET, Microphone	1	
-17	00-4547	. SCREW	2	
		-----*-----		
-18	211-60	. VALVE, Oxygen	1	
		ATTACHING PARTS		
-19	211-65	. SEALING WASHER	1	
-20	211-408	. SEALING WASHER	1	
-21	211-415	. CAP BEARING	1	
-22	211-283	. VALVE NUT	1	
		-----*-----		
-23	249-425	. UPPER AND CENTER CABLE GUIDE	2	
-24	450-13	. LOWER CABLE GUIDE	1	
-25	834-49	. DUST COVER, Assembly	1	
-26	358-643C	. SUSPENSION STRAP	1	

NUMERICAL INDEX

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CHAPTER 7

FULL-FACE OXYGEN AND SMOKE MASK

P/N 651-469

Section 7-1. Description

7-1. GENERAL.

7-2. The Full-Face Oxygen and Smoke Mask (figure 7-1) is designed to dispense gaseous oxygen from a demand type regulator. The mask also provides protection against smoke, carbon monoxide, or other incapacitating gases.

7-3. The mask may be fitted with earphones or be worn with a protective helmet. It is supplied in one size which is fitted by adjusting the adjustable headstraps of the molded rubber headstrap assembly.

7-4. CONFIGURATION.

7-5. The single configuration of the Full-Face Oxygen and Smoke Mask consists of a molded rubber facepiece with microphone cavity, allyl plastic lens, exhalation valve, three inhalation valves, and molded rubber headstrap assembly. The mask has a flexible black silicon oxygen delivery hose with an external communications lead coiled around it following the convolutions of the hose. Attached to the intake end of the hose is an MC-3A type connector.

7-6. FUNCTION.

7-7. When connected to an aircraft's oxygen system, the intake flow of oxygen is through the MC-3A connector, delivery hose, and inlet port (figure 7-2). Oxygen enters the mask through two inlet ducts positioned along the base of the facepiece lens. The oxygen then flows across the lens producing a defogging effect before passing to the user through two inhalation valves in the nosecup assembly.

7-8. The exhalation process is accomplished as the pressure of the user's exhaled breath overcomes the resistance of the valve springs and diaphragm of the exhalation valve. The exhalation valve is designed to yield to a pressure of less than 4 milligrams of mercury. This pressure is greater than the pressure of the intake oxygen supplied by the oxygen regulator. The net result is that upon exhaling, the pressure of the user's breath closes the inhalation valves in the nosecup assembly and opens the exhalation valve allowing the exhaled air to escape into the atmosphere.

7-9. SERVICE LIFE.

7-10. Service life of the Full-Face Oxygen and Smoke Mask as established by the cognizant engineering activity is indefinite. The mask is considered serviceable if it meets periodic inspection requirements.

Section 7-2. Modifications

7-11. GENERAL.

7-12. No modifications are required or authorized for this mask.

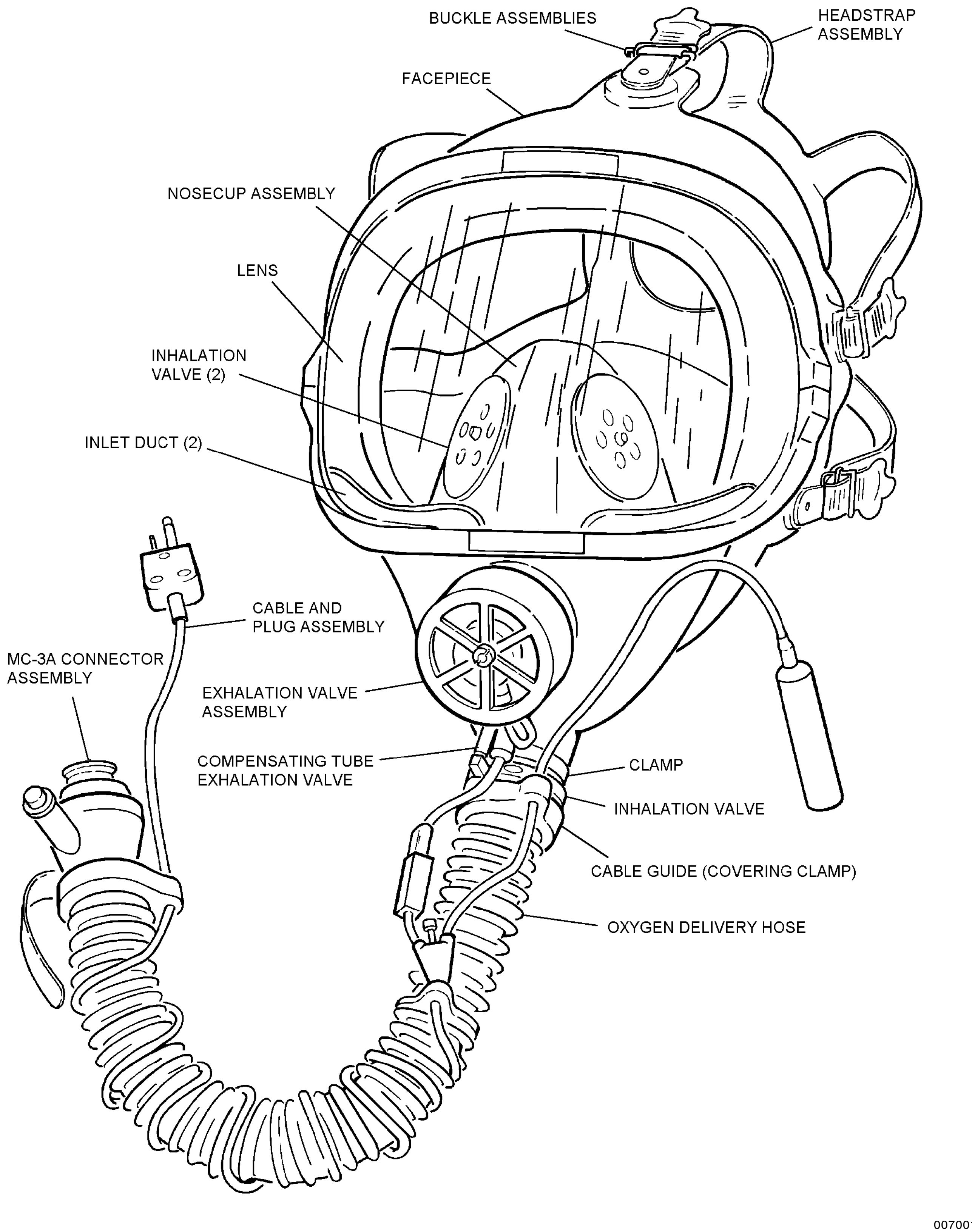


Figure 7-1. Full-Face Oxygen and Smoke Mask (P/N 651-469)

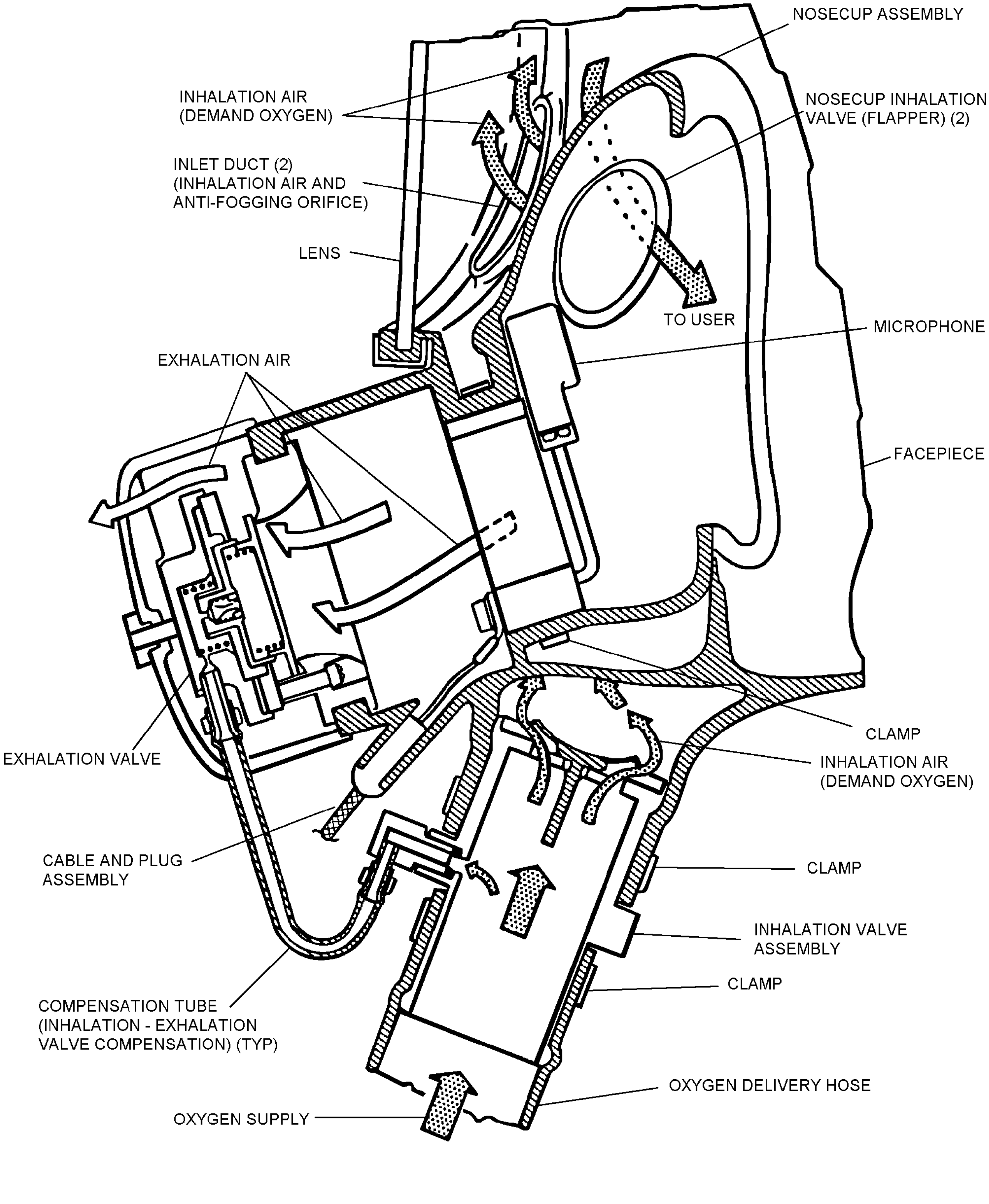


Figure 7-2. Functional Diagram of the Full-Face Oxygen/Smoke Mask

Section 7-3. Maintenance

7-13. GENERAL.

7-14. This section contains procedural steps for disassembly, cleaning, inspection, assembly, functional testing, sanitizing, and storage. All work shall be performed in a clean, oil and dust-free area.

NOTE

Upon completion of any maintenance action (e.g. inspection, repair, modification, etc.), be sure to complete the required Maintenance Data Collection System forms.

7-15. INSPECTION.

7-16. PREFLIGHT INSPECTION. The Preflight Inspection consists of a Visual Inspection and Functional Test performed before each flight by the aircrewmember who will use the mask. Perform the inspection as follows:

1. Perform Visual Inspection in accordance with paragraph 7-18.

2. Check mask communication functions for proper operation.

3. Perform Functional Test in accordance with paragraph 7-26.

4. If malfunctions are found or suspected, return mask to Aviator's Equipment Branch for corrective action.

7-17. ACCEPTANCE/SPECIAL INSPECTION. The Acceptance/Special Inspection consists of a Visual Inspection followed by a Functional Test. This inspection and test shall be performed in conjunction with the aircraft inspection requirements for the aircraft in which the masks are installed. To perform the inspection, proceed as follows:

1. Perform Visual Inspection in accordance with paragraph 7-18.

2. Check mask communication functions for proper operation.

3. Perform Functional Test in accordance with paragraph 7-26.

4. Sanitize mask in accordance with paragraph 7-27.

5. If malfunctions are found or suspected, return mask to Aviator's Equipment Branch for corrective action.

7-18. Visual Inspection. Minimum requirements of Visual Inspection of the Full-Face Oxygen and Smoke Mask shall consist of the following:

1. Inspect mask assembly interior and exterior and oxygen delivery hose for deterioration, wear, cracks, tears, cuts, soil, and presence of foreign matter.

2. Stretch oxygen delivery hose to expanded position. Inspect condition of hose at each convolution for signs of deterioration such as cracks, wear, or weakness.

3. Inspect condition of fit and seal at all connecting and attachment points in the facepiece and oxygen delivery hose which must hold pressure during operation. Particular attention shall be given to mask-to-hose and hose-to-connector points.

a. Grasp connection on both sides of hose clamp and jerk sharply.

CAUTION

Do not overtighten hose clamps; Mask or hose material may become pleated and lead to eventual failure due to tearing of material.

b. If separation occurs, reassemble and tighten hose clamp. If there is other evidence of loose fitting, ensure proper assembly and tighten clamp.

c. Repeat step 3 above to recheck security of connector.

4. Examine facepiece lens for cracks or crazing, and for scratches which may distort vision.

5. Inspect buckles and straps of headstrap assembly for security of attachment, deterioration, cuts, and proper operation and adjustment.

6. If malfunctions are found or suspected, return mask to Aviator's Equipment Branch for corrective action.

7-19. CALENDAR/PHASE/SDLM INSPECTION. A Calendar/Phase/SDLM inspection shall be performed upon issue and in accordance with the Planned Maintenance System (PMS) of the aircraft (see PMS publications for specific interval). The Calendar/Phase/SDLM inspection consists of the following:

1. Disassembly (paragraph 7-20).
2. Cleaning (paragraph 7-21).
3. Visual Inspection (paragraph 7-24).
4. Assembly (paragraph 7-25).
5. Functional Test (paragraph 7-26).
6. Sanitizing (paragraph 7-27).

7-20. Disassembly. Disassemble the mask using figure 7-5 for parts identification.

Support Equipment Required

Quantity	Description	Reference Number
1	Elastrator	00-6297 (CAGE 92114)
1	Pliers, Hose Clamp	450-813 (CAGE 92114)
1	Screwdriver, Broad-Tip (Modified)	Fabriate IAW figure 7-3
1	Screwdriver, Jeweler's	—

CAUTION

Remove lens (40) from mask assembly to prevent scratching or marring during maintenance.

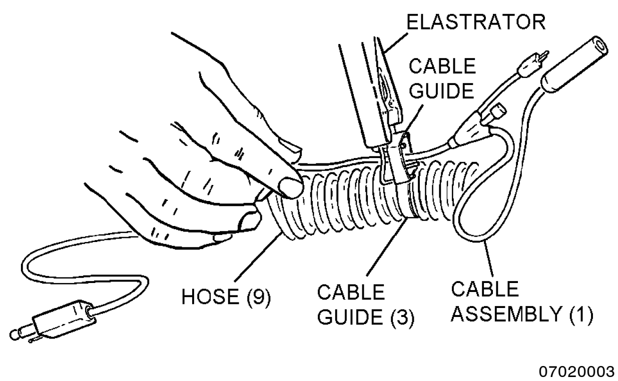
NOTE

Disassemble only to the extent necessary for cleaning, inspection, parts replacement, and Sanitizing or decontamination to restore mask to fully serviceable condition.

1. Remove screws (38) and nuts (39) and remove lens retainers (37) and lens (40) from mask assembly.

2. Depress small button on lower portion of connector on terminal cable and plug assembly (24) to separate from cable and plug assembly (1).

3. Using elastrator, spread cable guides (2 and 3) and remove cable and plug assembly (1).



Step 3 - Para 7-20

4. Move upper and lower cable guides (2) aside and remove hose clamps (4) using hose clamp pliers.

CAUTION

Do not attempt to remove press-fitted roll pins (8 or 23). Displacement of either pin may damage hose-seal surfaces of fitting assembly (7) or inhalation valve assembly (17).

CAUTION

To prevent damage to mask assembly, do not use any mechanical assist (screwdriver or similar tool) to remove delivery hose.

5. Remove fitting assembly (7) from oxygen hose (9), disconnect cord and snap assembly (6) from roll pin (8), and remove oxygen hose (9) from inhalation valve assembly (17).

6. Remove cable guides (2 and 3) from oxygen hose (9).

7. Using modified broad-tip screwdriver (figure 7-3), remove nut (16) and remove exhalation valve cover (15).

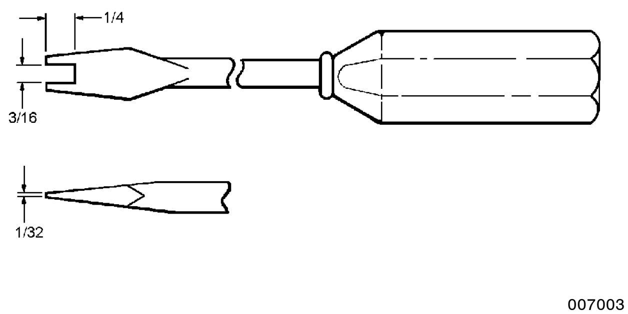


Figure 7-3. Modified Broad-Tip Screwdriver

8. Remove compensation tube assembly by removing four hose clamps (10), hoses (11 and 12), and coupling hose (13).

NOTE

Do not remove setscrew (18), coupling elbow (19), or O-ring (20) from inhalation valve assembly.

9. Using hose clamp pliers, remove hose clamp (5) then remove inhalation valve assembly (17) from facepiece (42).

10. Remove flapper valve (21) from inhalation valve body (22).

11. Remove exhalation valve assembly (14).

12. Reaching through cavity created by removal of exhalation valve assembly, remove socket head screws (25) and washers (26) which secure terminal cable and plug assembly (24) leads to contacts on microphone retainer and bracket assembly (figure 7-4) in nosecup (35).

13. Insert elastrator into cable and plug opening in facepiece (42). Spread opening sufficiently to remove cable and plug assembly leads.

14. Remove nosecup inhalation valve assemblies (27) from nosecup (35) and remove flapper valve (28) from valve housing (29).

15. Remove nosecup (35) from facepiece (42).

16. Using hose clamp pliers, remove clamp (30) from nosecup (35), then remove microphone (32) and microphone retainer and bracket assembly (31) from nosecup (35).

17. Using jeweler's screwdriver, loosen set screws on microphone (32). Remove attaching screws (33) and washer (34), and remove microphone from microphone retainer and bracket assembly (31) (figure 7-4).

18. Remove nameplate (36) only if replacement is required.

7-21. Cleaning. The full-face oxygen and smoke mask may be cleaned using a solution of either of the listed cleaning agents and warm potable water.

Materials Required

Quantity	Description	Reference Number
As required	Detergent, General Purpose, Type I	MIL-D-16791
	or	
As required	Soap, Laundry, Low-filter	P-S-600

Support Equipment Required

Quantity	Description	Reference Number
1	Brush, Test Tube, Dia. 1 1/2 Inches	—
1	Brush, Soft Bristle	—
1	Cloth, Lint-Free, Type II	MIL-C-85043
As required	Swab, Cotton	—

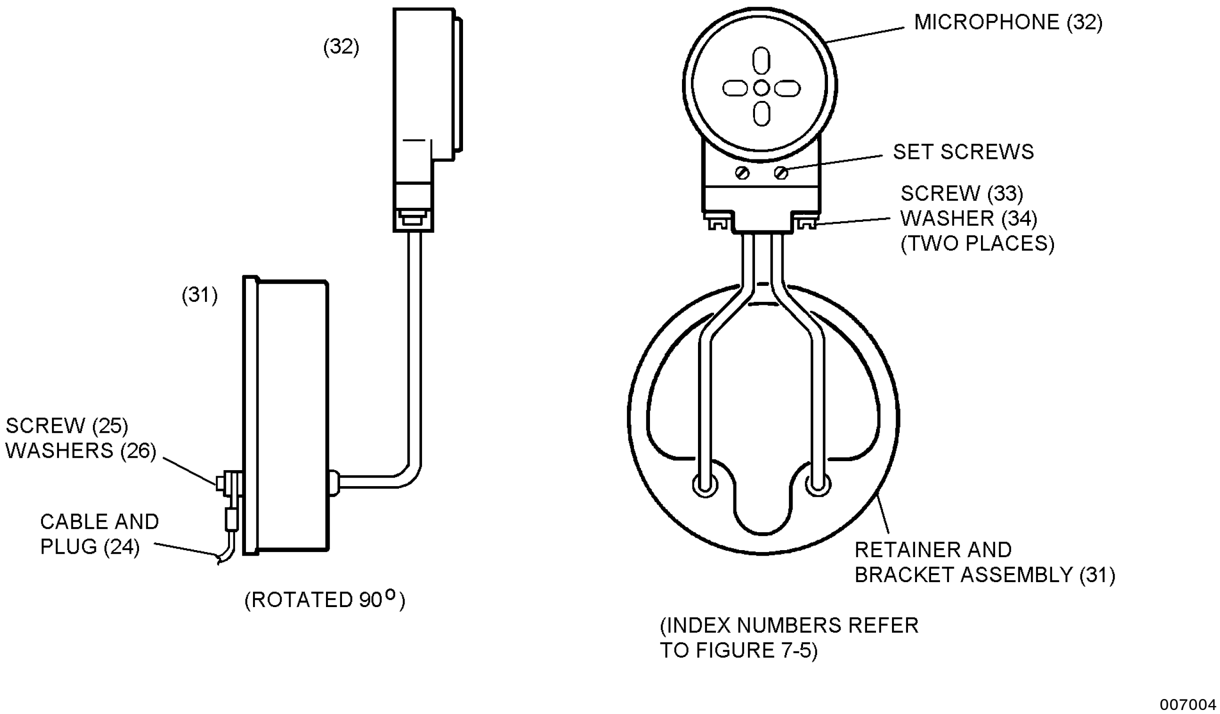


Figure 7-4. Microphone Retainer and Bracket Assembly

7-22. Each of the cleaning solutions prepared in the following quantities is sufficient to clean a minimum of 10 masks:

NOTE

The detergent solution is preferred since there is no risk of contamination due to undissolved soap powder residue.

1. DETERGENT SOLUTION. Add 1/4 to 1/2 ounce (liquid) of detergent to one gallon of warm potable water.

NOTE

If it is necessary that the soap powder solution be used, agitate solution and use only the lather to clean the mask.

2. SOAP POWDER SOLUTION. Add four (4) tablespoons of soap powder to one gallon of warm potable water. Hardness of water may require that more soap powder be used. The solution must be sufficiently strong to readily form lather when agitated. Ensure that all soap powder is dissolved.

7-23. Using the preferred detergent solution, when possible, clean mask as follows:

WARNING

Do not use alcohol in any form, flammable solvents, or liquid toxicants to clean mask.

CAUTION

Ensure microphone is removed before cleaning mask.

NOTE

Disassemble mask only to the extent necessary to clean and restore mask to serviceable condition.

1. Remove microphone assembly, lens, inhalation valve assemblies, and exhalation valve assembly before cleaning mask. Further disassembly shall be performed only to the extent necessary to ensure proper cleaning.

2. Wash external and internal surfaces of mask thoroughly to remove soil and foreign matter. A test tube brush (1 1/2 inches diameter) is recommended to clean interiors of inlet tube and inhalation port. Use soft bristled brush to clean all other surfaces of the mask.

3. After all surfaces have been cleaned, submerge mask in the cleaning solution and agitate thoroughly. Rinse mask in clean, cold potable water and shake to remove excess water.

4. Clean mask microphone and valve assemblies by wiping with swab of clean soft absorbent cloth lightly dampened with clean, potable water. Ensure that no lint remains on microphone or valve assemblies.

5. Use swab of clean soft absorbent cloth to assist in drying mask and components. Ensure that no lint is trapped in valves or crevices of mask. Air-dry in a ventilated area out of direct sunlight.

CAUTION

If mask is forced-air dried, use only clean, dry, oil-free air or nitrogen. Make sure all parts are completely dry before reassembling mask.

Do not use compressed gas to dry evaluation valve or microphone.

6. Assemble mask ensuring that mask and delivery hose are completely dry and free of undissolved soap powder and lint.

7-24. Visual Inspection. Inspection of disassembled mask shall consist of the following:

NOTE

Repair of the Full-Faced Oxygen and Smoke Mask shall be limited to parts replacement. Any hole, puncture, or tear in any component of the mask shall be basis for replacement of that component.

1. Inspect mask assembly for deterioration and material imperfections such as embedded foreign matter, and dirty, rough, misaligned, cracked, nicked, or otherwise flawed surface. Also inspect attached parts for security of attachment, corrosion, and proper function.

2. Inspect exhalation and inhalation valves for nicks, grooves, scratches, or any other damage or flaw which would affect pressure seal capability. If any component of a valve is defective, replace the valve.

3. Inspect headstraps for fraying, deterioration, cuts, or tears. Replace defective headstrap assembly.

4. Inspect oxygen delivery hose for cuts and deterioration such as cracks, abrasions, creases, or flat spots. Replace defective hose.

5. Check communications cable/microphone for electrical continuity and proper operation. Replace defective components.

7-25. Assembly. Assemble oxygen/smoke mask using following procedures. Refer to figure 7-5 for parts identification.

Support Equipment Required

Quantity	Description	Reference Number
1	Elastrator	00-6297 (CAGE 92114)
1	Pliers, Hose Clamp	450-813 (CAGE 92114)
1	Screwdriver, Broad-Tip (Modified)	Fabriate IAW figure 7-3
1	Screwdriver, Jeweler's	—

1. If required, peel paper back on nameplate (36) and position on lower frame of lens retainer (37).

2. Attach microphone (32) to microphone retainer and bracket assembly (31) using attaching screws (33) and washers (34).

3. Using jeweler's screwdriver, tighten set screws on microphone (32).

4. Insert retainer and bracket assembly (31), with attached microphone (32), in nosecup (35) and secure with clamp (30) using hose clamp pliers.

CAUTION

Moisten tip of stud on flapper valve (28) and press through center hole of flapper position in valve housing (29). Ensure that flange of stud is completely engaged on valve housing (29).

5. Install flapper valves (28) in valve housings (29) of nosecup inhalation valve assemblies (27) and install in nosecup assembly (35).

6. Install terminal cable and plug assembly (24) in facepiece (42) by using elastrator to expand cable opening in facepiece just enough to insert electrical leads and plug of terminal cable and plug assembly (24).

NOTE

When plug of terminal cable and plug assembly (24) is properly seated in cable opening of facepiece (42), the lead's contacts should be easily positioned on terminals of microphone retainer and bracket assembly (31) in nosecup (35).

7. Install nosecup (35) in mask assembly by seating flange of retainer and bracket assembly (31) (with microphone (32) installed) in mask assembly.

8. Through exhalation valve opening in facepiece (42), attach electrical leads of terminal cable and plug assembly (24) to terminals of microphone retainer and bracket assembly (31) using lockwashers (26) and sockethead screw (25).

9. Install valve flapper (21) in valve body (22) of inhalation valve assembly (17) by moistening tip of valve flapper (21) and pulling it through center hole of flapper position in valve body (22). Ensure that flange of flapper tip is completely engaged in valve body (22).

10. Install inhalation valve assembly (17) in mask assembly and secure with hose clamp (5) using hose clamp pliers.

11. Install exhalation valve assembly (14) by seating facepiece (42) in flange of valve body.

12. Install coupling (13) and hoses (11 and 12) and secure with hose clamps (10) using hose clamp pliers.

13. Install exhalation valve cover (15) on exhalation valve assembly (14) and secure with nut (16) using modified broad tip screwdriver (figure 7-3).

14. Attach nylon cord of snap and cord assembly (6) to roll pin (23). Thread snap and cord assembly (6) through oxygen hose (9).

NOTE

Ensure cord and snap assembly is 15 ± 1 inch long as measured from end of loop to end of clip. If new cord and snap assembly is required, cut nylon cord to 19 inches at loop end. Tie non-slip loop and cut opposite end of cord to attain proper length. Sear end of nylon cord.

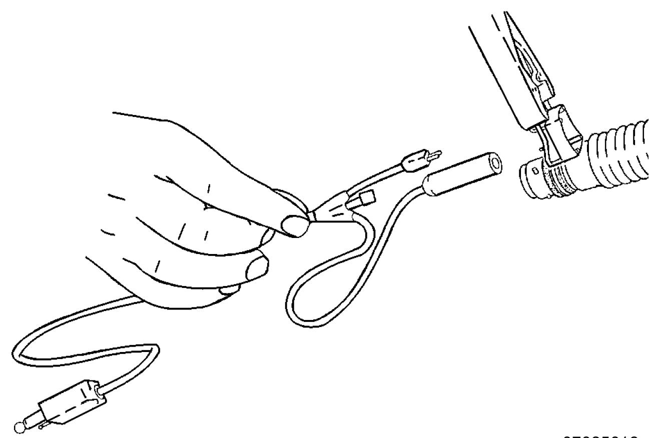
15. Install oxygen hose (9) on inhalation valve assembly (17) and secure with hose clamp (4) using hose clamp pliers.

16. Attach snap of snap and cord assembly (6) to roll pin (8).

17. Install oxygen hose (9) on end of fitting assembly (7) and secure with hose clamp (4) using hose clamp pliers.

18. Place cable guides (2) in position over hose clamps (4) and cable guide (3) in position on oxygen hose (9).

19. Using elastrator tool, expand lower cable guide (2) and insert cable and plug assembly (1) through lower cable guide leaving approximately six inches of cable and connector U-75/U below lower cable guide (2).



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Step 19 - Para 7-25

20. Coil cable and plug assembly (1) around oxygen hose (9) then using elastrator tool expand cable guide (3) and insert cable and plug assembly through cable guide to approximately one inch below yoke of cable.

CAUTION

Leave only enough slack in cable above cable guide (3) for freedom of movement during use of mask. Excessive slack provides potential for snagging.

21. Expand upper cable guide (2) using elastrator tool, and insert only connector JJ-026 and approximately six inches of cable through the cable guide.

NOTE

If connector JJ-026 is not to be used, double cable back from top cable guide and tape to cable assembly.

22. Connect cable and plug assembly (1) to terminal cable and plug assembly (24).

23. Install straps of headstrap assembly (41) in buckle assemblies of facepiece (42). Nomenclature of headstrap assembly (41) shall be on the outside (readable) when mask assembly is in donned position.

24. Position lens (40) on facepiece (42) and secure with lens retainers (37) using screws (38) and nuts (39).

25. Examine mask for proper assembly with emphasis on security of mask-to-hose and hose-to-connector connections.

7-26. Mask Functional Test. To perform functional test of mask, proceed as follows:

1. Plug the inlet end of connector assembly by any suitable method.

2. Holding mask close to face, but not sealed to face, inhale deeply. Then press mask firmly to face, forming a tight seal, and exhale forcibly. If the exhalation valve is operating properly, the exhalation will be smooth and with minimum resistance.

3. Affix mask assembly to face, adjusting straps for a snug, comfortable, leak-tight fit. With inlet end of hose assembly blocked, inhale sharply and deeply and hold inhalation (keep inhaling) as long as possible. If there is no leakage through mask hose, fittings, or exhalation valve, and as soon as all residual air in mask and hose has been inhaled, further inhalation will be impossible.

4. Obtain assistance from Avionics Branch to ensure proper continuity of communications leads.

7-27. Sanitizing Masks. Masks not on a personal-issue basis shall be sanitized after each use as follows:

Materials Required

Quantity	Description	Reference Number
As required	Benzalkonium Chloride Solution	MIL-B-37451
As required	Gauze Pads	MIL-G-3379B
As required	Sani Com 3205	NIIN 01-299-5061

NOTE

Pour benzalkonium chloride solution into a container sufficient to sanitize at least 10 masks.

If benzalkonium chloride solution is not available, Sani Com 3205, can be used.

1. Moisten a gauze pad with solution, squeeze to prevent dripping, and wipe interior of mask, except valves and microphone. Ensure that sanitizing solution penetrates all crevices.

2. Wipe valves and microphones with a clean, dry cloth. Ensure that no lint remains in mask, on valves, or on microphone.

7-28. After sanitizing, place mask in a clean approved bag. If the mask is not to be put into immediate service, store in accordance with paragraph 7-29.

7-29. MASK STORAGE.

7-30. After using a personal issue mask, wipe it clean and store it in a clean, approved plastic bag or any other suitable container that will keep the mask clean, dry and lint-free. Masks not used on a personal-issue basis shall be sanitized after each use before storage. Stored masks must have ample ventilation and not be exposed to excessive heat or direct sunlight. Do not store mask in an area where other flight gear will be stored on top of it.

Section 7-4. Illustrated Parts Breakdown

7-31. GENERAL.

7-32. This Section lists and illustrates the procurable parts of the Full-Face Oxygen and Smoke Mask.

7-33. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

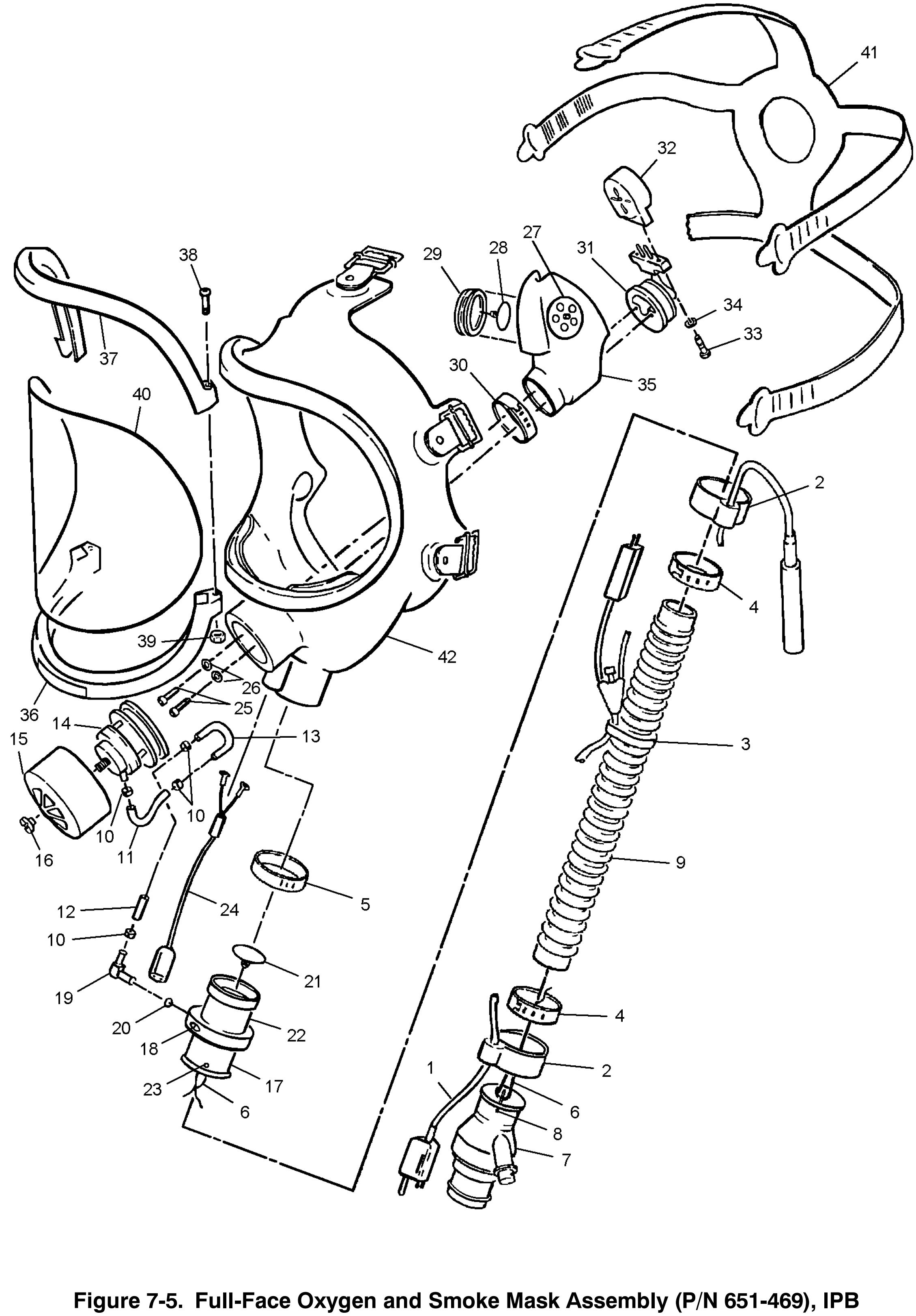


Figure 7-5. Full-Face Oxygen and Smoke Mask Assembly (P/N 651-469), IPB

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
7-5	651-469	MASK ASSY, Oxygen and Smoke .... Full-Face (92114)	REF	
-1	3072AS102-1	. CABLE AND PLUG ASSEMBLY (30003)	1	
	CE4707DTR	. CABLE AND PLUG ASSEMBLY (10875)	1	
-2	3072ASl01-3	. GUIDE, Cable (30003) (Clamp Cover)	2	
	651-275-1	. GUIDE, Cable (92114) (Clamp Cover)	2	
-3	3072ASl01-2	. GUIDE, Cable (30003)	1	
	651-274	. GUIDE, Cable (92114)	1	
-4	450-134A	. CLAMP, Hose (92114)	2	
-5	227-477-3	. CLAMP, Hose (92114)	1	
	651-493	. . COVER, Clamp (92114) .... (Not Illustrated)	1	
-6	339-16	. CORD AND SNAP ASSEMBLY (92114)	1	
-7	MS22016	. FITTING ASSEMBLY, Disconnect and .... Connector, Type MC-3A	1	
	232-94A	. FITTING ASSEMBLY, Disconnect and .... Connector, Type MC-3A	1	
-8	00-3082	. . PIN, ROLL (92114)	1	
-9	3072AS101-1	. HOSE, Oxygen (30003)	1	
	249-07-1	. HOSE, Oxygen (92114)	1	
	651-283-3	. TUBE ASSEMBLY, Compensation, ... Inhalation-Exhalation Valve (92114)	1	
-10	CE2301-012-4	. . CLAMP, Hose (78533)	4	
	00-4785	. . CLAMP, Hose (92114)	4	
-11	157-182-5	. . HOSE, Long (92114)	1	
-12	157-182-5	. . HOSE, Short (92114)	1	
-13	157-183	. . COUPLING, Hose (92114)	1	
-14	157-177-1	. VALVE ASSEMBLY, Exhalation (92114)	1	
-15	651-287-3	. . COVER, Exhalation Valve (92114) .... (Part of kit 651-284-2) (ATTACHING PART)	1	
-16	157-184-1	. . NUT (92114) .... ---*---	1	
-17	651-281	. VALVE ASSEMBLY, Inhalation (92114)	1	
-18	00-4916	. . SETSCREW (92114)	1	
-19	157-181	. . COUPLING ASSEMBLY (92114)	1	
-20	2-003	. . O-RING (92114)	1	
	00-4783	. . O-RING (92114)	1	
-21	211-166	. . FLAPPER VALVE (92114)	1	
-22	157-180	. . BODY, Valve (92114)	1	
-23	00-5276	. . . PIN, ROLL (92114)	1	
-24	651-482	. CABLE AND PLUG ASSEMBLY, Terminal ..... (ATTACHING PARTS)	1	
-25	00-6074	. SCREW, Socket Head Cap (92114)	2	
-26	AN936A2	. WASHER (88044) .... ---*---	2	
	651-483	. NOSECUP ASSEMBLY (92114)	1	

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
7-5-27	651-282-1	. . VALVE ASSEMBLY, Nosecup Inhalation (92114)	2	
-28	138-01-1	. . . FLAPPER VALVE (92114)	1	
-29	651-33	. . . HOUSING, Valve (92114)	1	
-30	651-31	. . CLAMP (92114)	1	
	CE3499-30-1	. . CLAMP (78533)	1	
-31	651-449	. . RETAINER AND BRACKET ASSEMBLY, Microphone (92114)	1	
-32	M-101/AIC	. . MICROPHONE (81349)	1	
	00-1587	. . MICROPHONE (92114)	1	
		(ATTACHING PARTS)		
-33	MS35275-204	. . SCREW (96906)	2	
	00-4547	. . SCREW (92114)	2	
-34	MS35833-70	. . WASHER (96906)	2	
	00-584	. . WASHER (92114)	2	
		---*---		
-35	651-447	. . NOSECUP (92114)	1	
-36	651-34	. NAME PLATE (92114)	1	
	651-481	. MASK ASSEMBLY (92114)	1	
-37	651-04	. . RETAINER, Lens (92114)	2	
		(ATTACHING PARTS)		
-38	MS51957-15	. . SCREW, 4 x 40 x 3/8 Panhead CRES	2	
-39	MS21043-04	. . NUT (96906)	2	
	00-2339	. . NUT (92114)	2	
		---*---		
-40	651-478-1	. . LENS (92114)	1	
	358-79	. . . COVER, Lens (92114) (Not Illustrated)	1	
-41	651-447	. . HEADSTRAP ASSEMBLY (92114)	1	
-42	651-11-19	. . FACEPIECE (92114)	1	
	651-283	KIT, Hose (92114)	REF	
	651-283-3	KIT, Hose (92114)	REF	
	651-284-2	KIT, Hose (92114)	REF	

NUMERICAL INDEX

Part Number	Figure and Index Number	SM&R Code
AN936A2	7-5-26	PAFZZ
CE2301-012-4	7-5-10	
CE3499-30-1	7-5-30	
CE4707DTR	7-5-1	
M-101/AIC	7-5-32	
MS21043-04	7-5-39	PAOZZ
MS22016	7-5-7	PAOZZ
MS35275-204	7-5-33	PAOZZ
MS35833-70	7-5-34	PAOZZ
MS51957-15	7-5-38	PAOZZ
00-1587	7-5-32	
00-2339	7-5-39	PAOZZ
00-3082	7-5-8	XA
00-4547	7-5-33	PAOZZ
00-4783	7-5-20	XA
00-4785	7-5-10	XA
00-4916	7-5-18	XA
00-5276	7-5-23	XA
00-584	7-5-34	PAOZZ
00-6074	7-5-25	PAFZZ
138-01-1	7-5-28	XA
156-177-1	7-5-14	PAOZZ
156-180	7-5-22	XA
156-181	7-5-19	XA
156-182-5	7-5-11	XA
	7-5-12	XA
156-183	7-5-13	XA
156-184-1	7-5-16	XA
2-003	7-5-20	XA
211-166	7-5-21	XA
226-477-3	7-5-5	PAFZZ
232-94A	7-5-7	PAOZZ

Part Number	Figure and Index Number	SM&R Code
249-06-1	7-5-9	PAFZZ
3072AS101-1	7-5-9	PAFZZ
3072AS101-2	7-5-3	
3072AS101-3	7-5-2	
3072AS102-1	7-5-1	
339-16	7-5-6	PAOZZ
358-79	7-5-40	PAFZZ
450-134A	7-5-4	PAFZZ
651-04	7-5-37	
651-11-19	7-5-42	XA
651-274	7-5-3	PAFZZ
651-275-1	7-5-2	PAFZZ
651-281	7-5-17	PAOZZ
651-282-1	7-5-27	PAFZZ
651-283	7-5-42	KF
651-283-3	7-5-9	
	7-5-42	KF
651-283-2	7-5-42	KF
651-287-3	7-5-15	KF
651-31	7-5-30	PAFZZ
651-33	7-5-29	XA
651-34	7-5-36	
651-447	7-5-35	PAFZZ
651-449	7-5-31	PAOZZ
651-469	7-5	PAOOO
651-477	7-5-41	XA
651-478-1	7-5-40	
651-481	7-5-36	PAFZZ
651-482	7-5-24	PAFZZ
651-483	7-5-26	PAFZZ
651-493	7-5-5	

CHAPTER 8

E-2C EMERGENCY OXYGEN SYSTEM

Section 8-1. Description

8-1. GENERAL.

8-2. The E-2C Emergency Oxygen System (P/Ns 269D200-3 and 269D200-5) is manufactured by East West Industries (CAGE 30941) (figure 8-1). The E-2C Emergency Oxygen System is designed to provide an emergency source of breathing oxygen during high altitude parachute descent. Table 8-1 contains leading particulars for the E-2C Emergency Oxygen System.

8-3. CONFIGURATION.

8-4. The E-2C Emergency Oxygen System is supplied in two basic configurations that are designed to be incorporated into a backpack assembly which includes a parachute assembly, liferaft assembly, and survival items.

8-5. FUNCTION.

8-6. Design characteristics and operation of the E-2C Emergency Oxygen System are described in this paragraph.

1. When an installed system is inactive (off), high pressure oxygen (1800 to 2000 psig, full) is present from the oxygen cylinder (13, figure 8-2) to the base of the poppet (6), and to the oxygen pressure gage (11). The oxygen pressure gage (11) indicates the amount of oxygen pressure available to the system at all times.

Table 8-1. Leading Particulars

E-2C Emergency Oxygen System (P/Ns 269D200-3 and 269D200-5)	250 to 2100 psig
Mounting	Installed E-2C Emergency Backpack Assembly
Operating Altitude Range	Up to 40,000 feet
Visual Indicator	Pressure Gage
Oxygen Cylinders	Two, 22.5 cu. in, P/N 235D300-3
Pressure Reducer Assy	Reduces system pressure down to 45 to 80 psig
CRU-79/P Oxygen Regulator	Model 3260024-0101
Overall Dimensions:	
Length	23 inches
Width	8 inches
Height	3 inches
Weight	6 pounds
Duration	Approximately 4 to 8 minutes depending on altitude

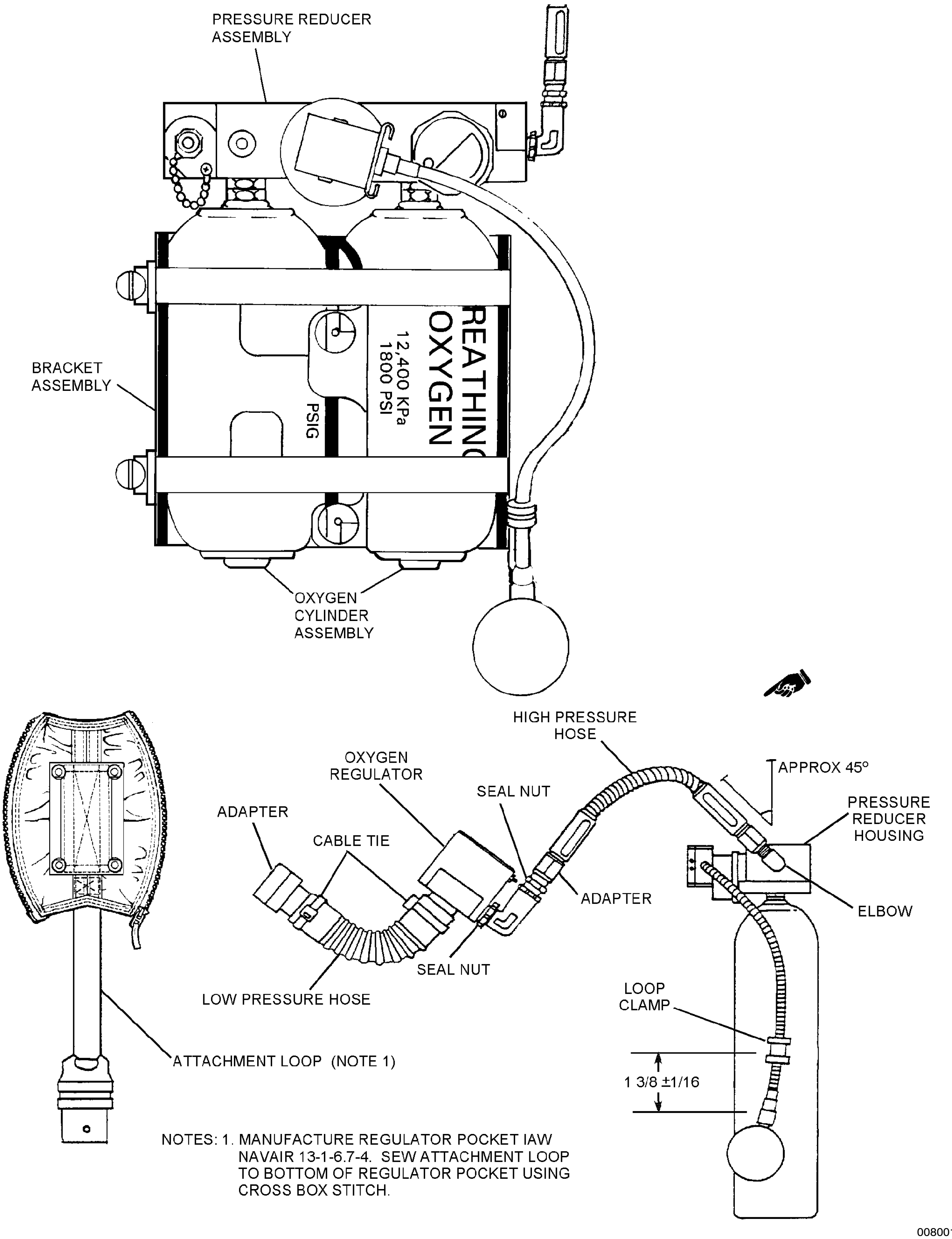
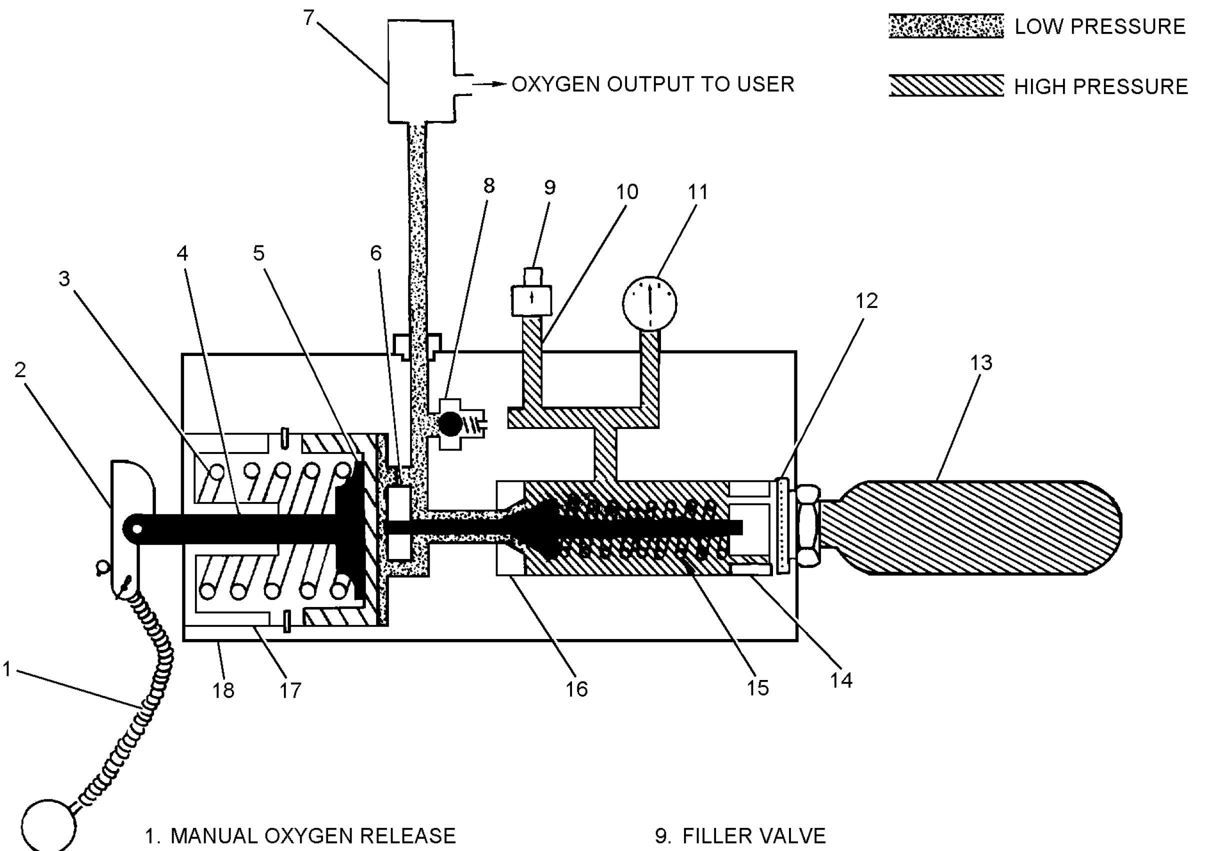


Figure 8-1. E-2C Emergency Oxygen System and Bracket Assembly



1. MANUAL OXYGEN RELEASE ASSY
2. TOGGLE
3. SPRING
4. PLUNGER
5. PISTON
6. POPPET
7. CRU-79/P OXYGEN REGULATOR
8. RELIEF VALVE
9. FILLER VALVE
10. FILTER
11. PRESSURE GAGE
12. FILTER
13. OXYGEN SUPPLY CYCLINDER
14. POPPET GUIDE
15. POPPET SPRING
16. POPPET SEAT
17. PISTON GUIDE
18. PRESSURE REDUCER ASSEMBLY

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Figure 8-2. E-2C Emergency Oxygen System Functional Diagram

2. When the manual oxygen release assembly (1) is pulled, toggle (2) will release spring (3), which forces plunger (4) down on piston (5). The force exerted on piston (5) moves poppet (6) away from the poppet seat (16) allowing reduced system oxygen pressure to flow to the relief valve (8) and to the inlet of the CRU-79/P oxygen regulator (7), providing the regulator with operating pressure.

3. The relief valve (8) is a safety feature for the system. In the event of system failure, relief valve (8) opens when operating pressure reaches 120 to 140 psig. This releases excess pressure to ambient and reduces supply pressure to 45 to 80 psig.

4. An inlet pressure of 45 to 80 psig provides operating pressure for the CRU-79/P oxygen regulator (7). The regulator provides emergency breathing oxygen at a pressure of 0.5 inches to 20.0 inches of water pressure depending on the altitude at which the E-2C system is used. The duration of breathing oxygen in a full cylinder of oxygen is approximately 4 to 8 minutes, depending on the altitude at which the system is used.

8-7. SERVICE LIFE.

8-8. E-2C Emergency Oxygen Systems shall remain in service as long as they continue to function properly.

Section 8-2. Modifications

8-9. GENERAL.

8-10. There are no modifications to the E-2C Emergency Oxygen System at this time.

Section 8-3. Performance Test Sheet Preparation

8-11. GENERAL.

8-12. Preparation of the Performance Test Sheet (figure 8-3), used during Bench Test, requires entering appropriate values for indicated flows and pressures in the spaces provided on the test sheet. The indicated flow and pressure values are determined from the test stand calibration correction cards. Refer to the appropriate ground support equipment manual for the test stand in use.

8-13. Test stand calibration correction cards are normally prepared during calibration of the test stands by converting actual flow and pressure readings to indicated flow and pressure values. Test stand calibration correction cards contain all the flow and pressure data required to test the E-2C Emergency Oxygen System. See test stand ground support equipment manual for calibration intervals.

8-14. The Performance Test Sheet shall be prepared as shown in figure 8-3. The Performance Test Sheet shown is a sample, but may be reproduced for local use.

8-15. The following tests require the extraction of appropriate indicated flow and/or pressures from the test stand calibration corrections cards:

Pressure Reducer Flow Test
Relief Valve Test

NOTE

For correction card numbers refer to appropriate ground support equipment manual.

8-16. SYSTEM PERFORMANCE TESTS.

8-17. PRESSURE REDUCER FLOW TEST. The E-2C Emergency Oxygen System pressure reducer assembly shall be capable of reducing system pressure to 45 to 80 psig while delivering a 0 to 100 liters per minute (lpm) flow. Determine the following values and enter them on the Performance Test Sheet:

1. Using calibration correction card number 2, determine the indicated psig values for actual pressures 45 and 80 psig and enter the values on the test sheet.

PERFORMANCE TEST SHEET

E-2C EMERGENCY OXYGEN SYSTEM

DATE: ______________________ PRESS. REDUCER SERIAL NO. ______________________

TEST STAND SERIAL NO. ____________ OPERATOR: ______________________

CDI: ____

1. VISUAL INSPECTION: SAT __________ UNSAT ______________________

   REMARKS:

   ____

2. EXTERNAL LEAKAGE (1800 PSIG): SAT ____________ UNSAT ______________

3. ACTUATOR PULL TEST (20 ± 10 FT-LB): ______________________________

4. PRESS REDUCER FLOW TEST (45-80 PSIG):

E-2 CYLINDER	DELIVERY PRESS		“0”	PG-1	ACTUAL	PG-2	PG-1
GAGE PRESS	ACTUAL	PG-1 INDICATED	LPM	READ	LPM	IND.	READ
1800	45		0		100		
250	80		0		100		

5. RELIEF VALVE TEST (120-140 PSIG):

ACT. PSIG	PG-1 IND	PG-1 READ	ACT. PSIG	PG-1 IND	ACT. LPM	PG-2 IND	ACT. PSIG	PG-1 IND	ACT. LPM	PG-2 IND	PG-2 READ
120			140		100		1		.01		
140											

6. EMERGENCY OXYGEN SYSTEM PURGE:

TEMPERATURE	CHARGING PRESSURE	CHARGE	DEPLETE	CHARGE	DEPLETE	FLOW 10 MIN
203°-266°F 110°-130°C	100 PSIG					

Figure 8-3. Performance Test Sheet, E-2C Emergency Oxygen System (Sheet 1 of 2)

7. EMERGENCY OXYGEN CHARGE: (FILL TIME EACH STAGE MINIMUM 3 MINUTES WITH A 2 MINUTES COOL DOWN BETWEEN STAGES)

STAGE	PSIG
1	0-500
2	500-1000
3	1000-1500
4	1500-1800
5	1800-2000

AMBIENT AIR TEMPERATURE		CHARGING PRESSURE
°F	°C	PSIG
0	-18	1550-1750
10	-12	1600-1775
20	-7	1625-1800
30	-1	1675-1850
40	5	1700-1875
50	10	1725-1925
60	16	1775-1975
70	21	1800-2000
80	27	1825-2050
90	32	1875-2075
100	38	1900-2125
110	43	1925-2150
120	49	1975-2200
130	54	2000-2225

Figure 8-3. Performance Test Sheet, E-2C Emergency Oxygen System (Sheet 2 of 2)

2. Using calibration correction card number 4, determine the indicated inches of water pressure (inH_2O) for actual flow of 100 lpm and enter the value on the test sheet.

8-18. RELIEF VALVE TEST. The relief valve is designed to open at a pressure between 120 and 140 psig and vent pressure at a rate of at least 100 lpm with an applied pressure of 140 psig. The maximum allowable leakage with an applied pressure of 110 psig is 0.01 lpm. Determine the following values and enter them on the Performance Test Sheet:

1. Using calibration correction card number 2, determine the indicated psig for actual pressures 110, 120, and 140, and enter the values on the test sheet.

2. Using calibration correction card number 4, determine the indicated inches of water pressure (inH_2O) for the actual flow of 100 lpm and enter the value on the test sheet.

3. Using calibration correction card number 7, determine the indicated inches of water pressure (inH_2O) for the actual flow of 0.01 lpm and enter the value on the test sheet.

Section 8-4. Maintenance

8-19. GENERAL.

8-20. This section contains the procedures for inspection, testing, troubleshooting, disassembly, cleaning, repair, assembly, and adjustment of the E-2C Emergency Oxygen System.

NOTE

Upon completion of any maintenance action (e.g., inspection, repair, modification, etc.) be sure to complete the required maintenance data collection system form.

8-21. Procedural steps outlined in this section are listed under the inspection cycle in which they are required and in the sequence in which they normally occur.

8-22. INSPECTION.

8-23. ACCEPTANCE/TURNAROUND/DAILY/PREFLIGHT/POSTFLIGHT AND TRANSFER INSPECTION. Required Visual Inspections of aircraft, (acceptance, turnaround, daily, preflight, postflight, and/or transfer) by the responsible aircrew personnel shall include a Visual Inspection of the E-2C emergency backpack assembly whenever the assembly is installed in the aircraft being inspected.

8-24. Any E-2C Emergency Oxygen System which does not pass the Visual Inspection (other than the requirement for topping-off system pressure) shall be removed from the aircraft and replace with a ready for issue (RFI) unit.

8-25. Visual Inspection. The Visual Inspection of the E-2C Emergency Oxygen System and the immediate vicinity shall include the following:

WARNING

Ensure that clothing, equipment, and work area are free of dirt, grease, oil, fuels, hydraulic fluids, or other combustible materials or hydrocarbons. Fire and/or explosion may result if even slight traces of these combustible materials come in contact with oxygen under pressure.

NOTE

Index numbers referred to reference figure 8-13 unless otherwise noted.

1. Ensure that clothing, equipment, and work area are free of dirt and combustible materials.

2. Ensure legibility of nameplate, all placards, and other markings.

3. Check security of attachment of the emergency oxygen system to the E-2C emergency backpack assembly (three attaching screws on back of backpack assembly).

4. Check pressure gage (49, figure 8-13) to ensure system pressure is 1800 to 2150 psig.

5. Check manual release assembly (40) for security of attachment to cocking toggle (38).

6. Check manual release assembly cable (40) for broken strands of wire, kinks, bends, broken housing, security of loop clamp (54), and secure attachment of the manual actuation ball.

7. Check for corrosion on and around the oxygen system.

8. Check date of last bench test. No more than 224 days shall have passed since the last bench test.

9. Check CRU-79/P regulator (5) for security and apparent visual damage.

10. Check high pressure hose for good condition and security of attachment.

8-26. Components of the aircraft oxygen system which do not pass inspection and cannot be repaired in the aircraft shall be removed and replaced with a ready for issue (RFI) component. Forward defective components to AIMD for bench test.

8-27. CALENDAR INSPECTION. The Calendar Inspection shall be performed on all E-2C Emergency Oxygen Systems prior to placing in service, and at intervals not exceeding 224 days thereafter. This interval applies to all E-2C Emergency Oxygen Systems; aircraft installed, shop spares, and those maintained in servicing pools.

8-28. The Calendar Inspection consists of a Visual Inspection followed by a Bench Test. All work shall be performed in a clean, dust-free and oil-free area. E-2C Emergency Oxygen Systems found to be damaged or out of adjustment shall be repaired by replacing or adjusting the discrepant part or parts. After repair, repeat the Bench Test.

8-29. Visual Inspection. Perform a Visual Inspection of the E-2C Emergency Oxygen System in accordance with table 8-2 and record the results on the Performance Test Sheet (figure 8-3).

8-30. E-2C Emergency Oxygen Systems failing the Visual Inspection or Bench Test (paragraph 8-31) shall be repaired, if specific repair is authorized. SM&R codes define repairable components and levels of maintenance authorized to perform repairs. Further explanation is found in Naval aviation maintenance program manual, OPNAVINST 4790.2 Series.

8-31. BENCH TEST.

WARNING

When working with oxygen, make certain that clothing, tube fittings and equipment are free of oil, dirt, grease, fuel, hydraulic fluid, or any combustible material. Fire or explosion may result when even slight traces of combustible material come in contact with oxygen under pressure.

Prior to use, inspect leak detection compound. Compound which is not clear and free from suspended material/sediment is considered contaminated and shall be disposed of. Compound exhibiting peculiar odors such as acetone or alcohol is considered contaminated and shall be disposed of.

NOTE

Some liquid oxygen converter test stands that bear part numbers other than those mentioned in paragraph 8-32 or covered in appropriate ground support equipment manual still exist. Use of these test stands is authorized provided they are capable of monitoring the E-2C Emergency Oxygen System performance as specified in the Bench Test.

8-32. The Bench Tests shall be performed using liquid oxygen converter test stand P/Ns 59A120, 31TB1995-1, 31TB1995-4, or 1455AS100-1. Do not attempt to perform any bench test without first becoming thoroughly familiar with the test stand and its operation. Refer to NAVAIR 17-15BC-23 for the details of test stand operations and service. The operator shall also be thoroughly familiar with the test to be performed, the anticipated results of the test, and how to record the results on the Performance Test Sheet. The Performance Test Sheet (figure 8-3) shall be used to record test data when performing all bench tests.

Table 8-2. Visual Inspection of the E-2C Emergency System

Part Nomenclature	Index Number	Inspect for	Remedy
Note: Index numbers in this table refer to figure 8-13.			
Identification plates.	-50	Legibility, condition, and security.	Secure in place, or replace.
Cylinders.	-11	Corrosion, proper marking, proof test markings.	Replace or apply as required. Replace cylinder.
Actuation cable and cable housing.	-40	Corrosion, broken cable strands, damage, bent or cracked housing, security of attachment, or other obvious damage.	Replace, clean, or tighten as necessary.
Pressure reducer housing.	-1	Corrosion, stripped threads, cracks, dents, other obvious damage.	Repair or replace as necessary.
Pressure gage assembly.	-49	Security of attachment legibility, other obvious damage.	Tighten or replace as necessary.
Oxygen filler valve.	-29	Stripped threads, dirt, or other obvious damage.	Replace.
Relief valve assembly.	-24	Dirt, corrosion, security of attachment.	Tighten or replace as necessary.
Low Pressure Hose.	-9	Holes, fraying, and good condition.	Replace.
High Pressure Hose.	-2	Cuts, fraying, breaks, and good condition.	Replace.
Seal Nuts.	-4	Good condition.	Replace.

NOTE

Tests are arranged so they proceed from one test to the next with a minimum of flow changes. Troubleshooting tables are provided following each test.

8-33. BENCH TEST CRU-79/P OXYGEN REGULATOR. Bench Test the Oxygen Regulator using the following procedures:

NOTE

Index numbers refer to figure 8-4 unless otherwise noted.

1. Cut and remove cable tie (7) from low pressure hose (8) at CRU-79/P Oxygen Regulator (6) outlet.

2. Disconnect low pressure hose (8) from CRU-79/P Oxygen Regulator (6).

3. Loosen seal nut (4) from adapter (3) and remove CRU-79/P Oxygen Regulator (6) and elbow (5) from adapter (3).

4. Bench test CRU-79/P Oxygen Regulator in accordance with NAVAIR 13-1-6.4-2.

8-34. CHARGING THE E-2C EMERGENCY OXYGEN SYSTEM. Charging (filling) the Emergency Oxygen System with aviator's breathing oxygen is a critical operation requiring close attention to procedures. To charge the system, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Aviator's Breathing Oxygen, Type 1	MIL-O-27210

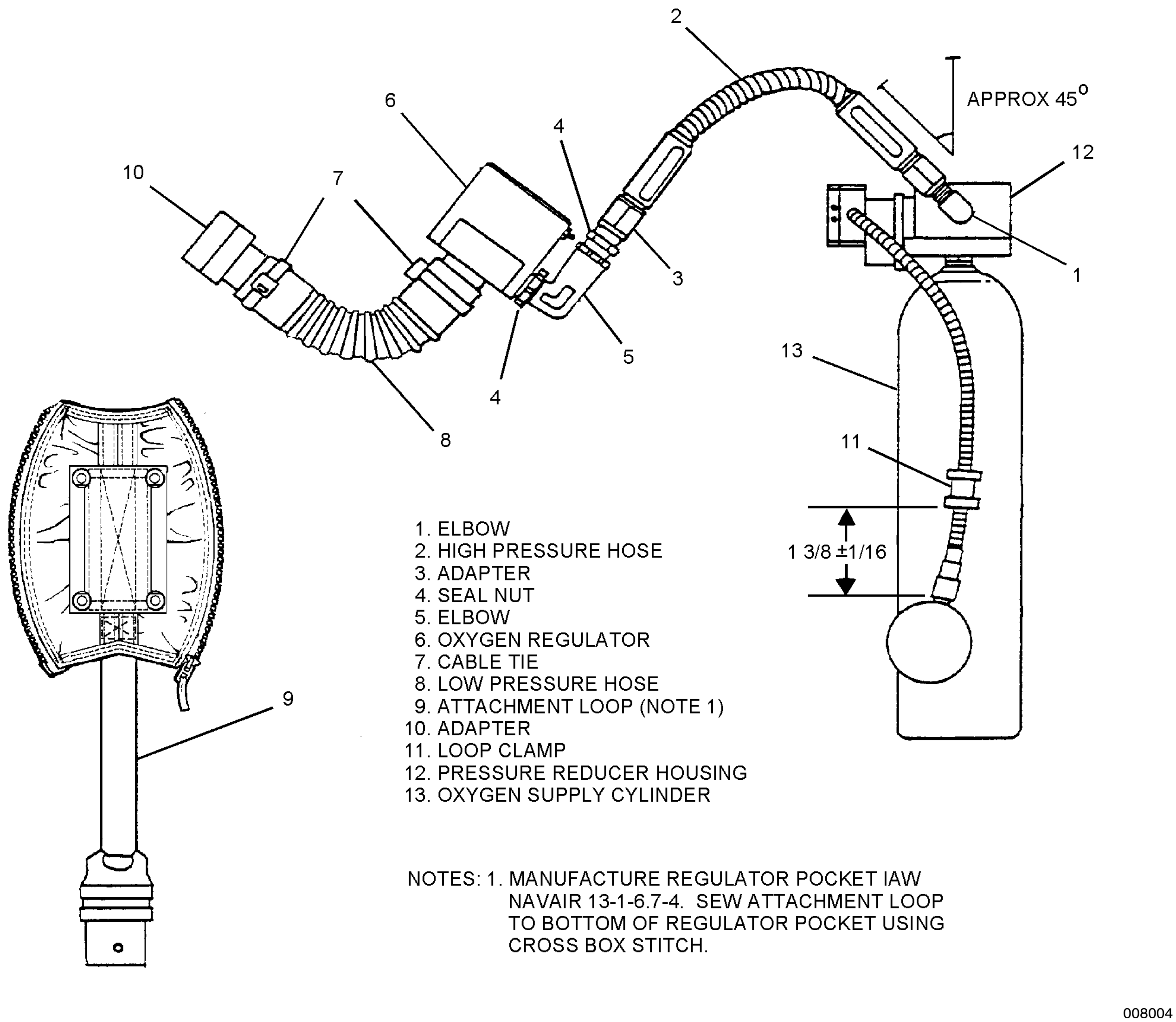


Figure 8-4. E-2C Emergency Oxygen System Configuration

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter, Filler	T186C100-1 (CAGE 30941)
1	Regulator, Pressure	283028-0001 (CAGE 99657) NIIN 01-101-8827 or equivalent

1. Open then close oxygen supply cylinder to purge oxygen cylinder.

NOTE

If the E-2C Emergency Oxygen System is contaminated or the supply cylinders have been empty for more than two hours, purge the system in accordance with paragraph 8-39.

2. Connect pressure regulator to oxygen supply cylinder (11, figure 8-13).

3. Connect filler adapter to pressure regulator.

4. Remove filler cap (28) from filler valve (29) of E-2C Emergency Oxygen System.

5. Connect filler adapter to filler valve (29).

6. Ensure pressure reducer has been reset (toggle (38) in up (off) position).

7. Open oxygen supply cylinder.

NOTE

Refer to table 8-3 for filling stages and table 8-4 for ambient air temperature vs charging pressures.

WARNING

Observe filling stages, as rapid application of oxygen pressure creates heat which may result in fire or explosion.

Allow no less than three minutes for each filling stage and two minutes between each stage for cooling.

Table 8-3. Charging Stages

STAGE	PSIG
1	0-500
2	500-1000
3	1000-1500
4	1500-1800
5	1800-2000

Table 8-4. Ambient Air Temperature Vs Charging Pressures

AMBIENT AIR TEMPERATURE		CHARGING PRESSURE
°F	°C	PSIG
0	-18	1550-1750
10	-12	1600-1775
20	-7	1625-1800
30	-1	1675-1850
40	5	1700-1875
50	10	1725-1925
60	16	1775-1975
70	21	1800-2000
80	27	1825-2050
90	32	1875-2075
100	38	1900-2125
110	43	1925-2150
120	49	1975-2200
130	54	2000-2225

8. Using pressure regulator, charge the E-2C Emergency Oxygen System to 1800 psig with aviator's breathing oxygen in strict compliance with tables 8-3 and 8-4.

9. Close oxygen supply cylinder.

10. Turn pressure regulator to vent position.

WARNING

Visually check to ensure that filler valve (29) does not turn (loosen) as filler adapter is removed. Serious injury could result.

11. Loosen filler adapter until all pressure is bled from high pressure line. Remove filler adapter from filler valve (29).

12. Proceed to External Leakage Test.

8-35. EXTERNAL LEAKAGE TEST. To perform the External Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Leak Detection, Type I	MIL-L-25567

Support Equipment Required

Quantity	Description	Reference Number
1	LOX Converter Test Stand	P/N 59A120 or 31TB1995-1 or 31TB1995-4 or 1455AS100-1

WARNING

If any leakage is encountered, the E-2C Emergency Oxygen System must be depleted of all pressure prior to attempting any repairs.

Prior to use, inspect leak detection compound. Compound which is not clear and free of suspended material/sediment is considered contaminated and shall be disposed of. Additionally, if the compound has any peculiar odors such as acetone or alcohol it is considered contaminated and shall be disposed of.

Apply leak detector compound sparingly to avoid penetration and contamination of oxygen system.

1. Apply leak detection compound to the oxygen filler valve (29, figure 8-13), pressure gage assembly (49), pressure reducer assembly outlet port, all inlet attach points, and all external screws and plugs.

NOTE

No leakage is acceptable. Leaks are indicated by the formation of bubbles in the leak detection compound.

2. Upon completion of the test, remove all trace of the leak detection compound using a damp, clean, lint-free cloth.

3. Record results of the test on the performance test sheet (figure 8-3).

WARNING

If any leakage is detected, the E-2C Emergency Oxygen System shall be depleted of all pressure prior to attempting any repair action. To deplete system of pressure, pull manual oxygen release assembly.

4. If any leakage is detected, refer to table 8-5, Troubleshooting (External Leak).

8-36. ACTUATOR PULL TEST. The following procedures incorporate the use of a liquid oxygen converter test stand and a locally manufactured actuator pull-test lanyard (figure 8-5). To perform the Actuator Pull Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Leak Detection, Type I	MIL-L-25567

Support Equipment Required

Quantity	Description	Reference Number
1	LOX Converter Test Stand	P/N 59A120 or 31TB1995-1 or 31TB1995-4 or 1455AS100-1

1. Ensure all test stand valves are properly secured. Using test stand hose, connect pressure reducer assembly outlet port to test stand SUPPLY TO CONVERTER supply connection (NIP-6).

2. Open TEST PRESSURE GAGE BUILD-UP AND FLOW valve (V-10).

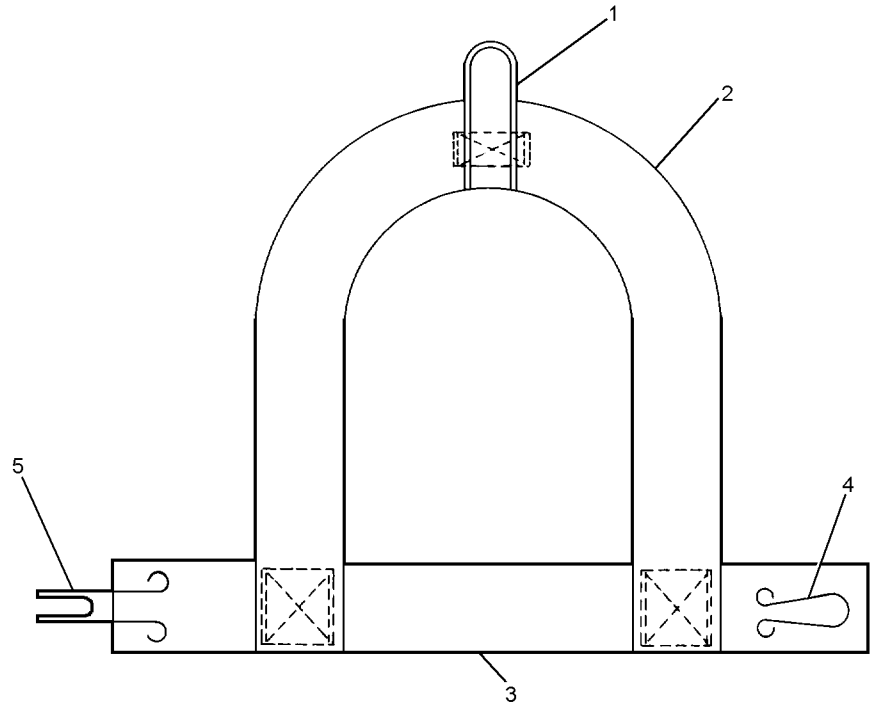
3. Connect test stand hose assembly (P/N 59A120B5-12) to CONVERTER SUPPLY OUTLET connection (NIP-5) and 0-150 lpm FLOWMETER connection (NIP-4).

4. Attach locally manufactured actuator pull test lanyard (figure 8-5) to green actuator ball and attach 50 pound push/pull scale to actuator pull test lanyard. Applying a steady, straight pull, measure and record force required to actuate the pressure reducer assembly (force required shall be 10 to 30 pounds).

NOTE

At this point, 0-160 psig TEST PRESSURE gage (PG-1) shall indicate 45 to 80 psig.

5. If force required to actuate pressure reducer assembly is not within tolerance (10-30 pounds), adjust cable of manual release assembly (40, figure 8-13) by loosening nut (36), adjusting nut (35), and retightening nut (36).



1. TWO-INCH LOOP, TYPE I, NYLON CORD, NIIN 00-240-2154
2. NINE INCHES, TYPE III, 1/2 INCH NYLON TAPE, MIL-T-5038C
3. FOUR INCHES, TYPE III, 1/2 INCH NYLON TAPE, MIL-T-5038C
4. LOCK SPRING TURN, P/N 212257-1 (CAGE 80020), NIIN 00-992-5577
5. HOOK, P/N 212257-2 (CAGE 80020), NIIN 00-095-0067

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Figure 8-5. Actuator Pull Test Lanyard

Table 8-5. Troubleshooting (External Leakage)

Trouble	Probable Cause	Remedy
Filler valve leaks.	Leakage around thread.	Tighten filler valve as necessary.
	Leakage around filler valve core.	Tighten or replace filler valve core.
Pressure gage leaks.	Loose gage, damaged threads, or damage bordon tube.	Tighten or replace gage.
Oxygen cylinder leaks.	Loose cylinder, stripped threads or damage O-ring.	Tighten or replace fittings, O-rings or cylinders as necessary.
External Allen screws leak.	Loose or stripped thread, damaged O-ring.	Tighten or replace screws or O-rings as necessary.
Outlet port of pressure reducer leaks.	Poppet assembly of pressure reducer scared or worn or damaged seat.	Replace poppet assembly or seat.

NOTE

Leave all connections and valves unchanged and proceed to Pressure Reducer Flow/Leakage Test.

8-37. PRESSURE REDUCER FLOW TEST. To perform the Pressure Reducer Flow Test, the E-2C Emergency Oxygen System must be fully charged to 1800 psig. Proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	LOX Converter Test Stand	P/N 59A120 or 31TB1995-1 or 31TB1995-4 or 1455AS100-1

1. Turn FLOW SELECTOR valve (V-1) on the test stand to the 0-150 lpm position FLOWMETER connection (NIP-4).

2. With a 0 lpm flow, record TEST PRESSURE gage (PG-1) reading on Performance Test Sheet (reading must be between 45 and 80 psig).

3. Slowly open test stand CONVERTER SUPPLY FLOW CONTROL valve (V-9) until 100 lpm is indicated on the FLOWMETER INDICATOR gage (PG-2). Immediately record TEST PRESSURE gage (PG-1) reading on Performance Test Sheet (reading shall be between 45 and 80 psig).

4. Close CONVERTER SUPPLY FLOW CONTROL valve (V-9).

5. Open CONVERTER SUPPLY FLOW CONTROL valve (V-9) and observe pressure gage (49, figure 8-13) on pressure reducer assembly. When the indicator needle on the pressure gage bisects the E and F in the word, REFILL, on the dial, close the CONVERTER SUPPLY FLOW CONTROL valve (V-9).

6. Record the reading from the TEST PRESSURE gage (PG-1) on the Performance Test Sheet (reading shall be 45 to 80 psig).

7. Open CONVERTER SUPPLY FLOW CONTROL VALVE (V-9) to indicate 100 lpm on FLOWMETER INDICATOR gage (PG-2).

8. Record reading from TEST PRESSURE gage (PG-1) on Performance Test Sheet (reading shall be 45 to 80 psig).

9. Deplete all oxygen pressure from E-2C emergency oxygen system using CONVERTER SUPPLY FLOW CONTROL valve (V-9).

10. Close CONVERTER SUPPLY FLOW CONTROL valve (V-9).

11. Disconnect E-2C emergency oxygen system from SUPPLY TO CONVERTER connection (NIP-6).

12. Close TEST PRESSURE GAGE BUILD-UP AND FLOW valve (V-10).

13. Disconnect hose (P/N 59A120-B5-12) from 0-150 lpm connection FLOWMETER (NIP-4) and CONVERTER SUPPLY OUTLET (NIP-5).

14. If readings are not within tolerance, refer to table 8-6, Troubleshooting (Flow Test).

15. Proceed to Relief Valve Test.

Table 8-6. Troubleshooting (Flow Test)

Trouble	Probable Cause	Remedy
Pressure steadily increases on PG-1 with 0 flow.	Poppet assembly leaks.	Replace poppet assembly index numbers.
Pressure drops below 45 psig with 100 lpm.	Pressure reducer set too low.	Readjust pressure reducer (paragraph 8-51).
	Dirty filter.	Replace filter.
Pressure does not indicate 45 to 80 psig with 0 flow.	Pressure reducer out of adjustment.	Readjust pressure reducer (paragraph 8-51).

8-38. RELIEF VALVE TEST. To perform Relief Valve (24, figure 8-13) Test using LOX converter test stand, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	LOX Converter Test Stand	P/N 59A120 or 31TB1995-1 or 31TB1995-4 or 1455AS100-1
18 inches	Tubing, Non-metallic, 5/8-inch Inside Diameter	9561-D47 (available Thomas Scientific, 99 High Hill Rd, P.O. Box 99, Swedesboro, N.J. 08085-0099) or equivalent

1. Reset E-2C Emergency Oxygen System pressure reducer assembly toggle (38, figure 8-13) in up (off) position.

2. Using test stand hose, connect outlet of pressure reducer assembly to test stand BELL JAR BOTTOM COUPLING (C-1).

3. Attach non-metallic tubing over relief valve assembly (24).

4. Attach other end of non-metallic tubing to test stand 0-150 lpm FLOWMETER connection (NIP-4).

5. Ensure test stand DIFFERENTIAL PRESSURE SHUT-OFF valve (V-8) is closed.

6. Open TEST PRESSURE GAGE-TO-BELL JAR valve (V-2).

7. Turn test stand FLOWMETER SELECTOR valve (V-1) to 0-150 lpm FLOWMETER Connection position (NIP-4).

CAUTION

Increase pressure slowly. Any rapid surge in pressure could damage test stand FLOWMETER INDICATOR gage (PG-2).

8. Slowly open test stand OXYGEN SUPPLY valve (V-6) while observing FLOWMETER INDICATOR gage (PG-2) for any erratic movement.

9. Observe open pressure of relief valve as indicated on TEST PRESSURE gage (PG-1) and record reading on Performance Test Sheet. Pressure reading shall be 120 to 140 psig.

10. Slowly increase pressure by opening the OXYGEN SUPPLY valve (V-6) until a 100 lpm flow is indicated on the FLOWMETER INDICATOR gage (PG-2).

11. Observe reading on the TEST PRESSURE gage (PG-1) and record on the Performance Test Sheet. Reading shall not exceed 140 psig.

12. Close test stand OXYGEN SUPPLY valve (V-6).

13. Open SYSTEM BLEED valve (V-5) until 110 psig is indicated on the TEST PRESSURE gage (PG-1).

14. Disconnect non-metallic tubing from 0-150 lpm FLOWMETER connection (NIP-4).

15. Turn FLOWMETER SELECTOR valve (V-1) to 0-0.25 lpm FLOWMETER connection (NIP-1).

CAUTION

Attach non-metallic tubing to FLOWMETER connection (NIP-1) slowly. Excessive relief valve leakage could damage FLOWMETER INDICATOR gage (PG-2).

16. Slowly attach non-metallic tubing (P/N 9561-D47 or equivalent) to 0-0.25 lpm FLOWMETER connection (NIP-1) while observing FLOWMETER INDICATOR gage (PG-2) for erratic movement.

17. Observe relief valve leakage reading on FLOWMETER INDICATOR gage (PG-2) and record on Performance Test Sheet. (Leakage shall not exceed .01 lpm.)

18. Disconnect non-metallic tubing from 0-0.25 lpm FLOWMETER connection (NIP-1).

19. Open SYSTEM BLEED valve (V-5) and bleed pressure from test stand.

20. Disconnect pressure reducer assembly outlet from BELL JAR BOTTOM COUPLING (C-1).

21. Remove non-metallic tubing from relief valve (24).

22. Secure all test valves.

23. If relief valve test readings are not within tolerance, refer to table 8-7, Troubleshooting (Relief Valve Test.

24. Proceed to E-2C Emergency Oxygen System purge.

8-39. EMERGENCY OXYGEN SYSTEM PURGE. To purge the E-2C Emergency Oxygen System, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter, Filler	T186C100-1 (CAGE 30941)

WARNING

Use only oil-free nitrogen, Type 1, Class 1, Grade B for purging LOX converters.

Purging unit model A/M26M-3 has two specially designed 3500 psig nitrogen cylinders. Do not substitute these cylinders with other nitrogen cylinders such as NAN cart cylinders.

While operating purging unit A/M26M-3, protective gloves must be worn by operator. Discharge fittings and hoses can reach temperatures that will cause burns if grasped with bare hands.

NOTE

Personnel operating purging unit model A/M26M-3 should be thoroughly familiar with all valves and controls. Prior to operating refer to appropriate support equipment manual. Personnel operating purging unit model A/M26M-3 shall be licensed in accordance with OPNAVINST 4790.2 Series.

Table 8-7. Troubleshooting (Relief Valve Test)

Trouble	Probable Cause	Remedy
Excessive leakage.	Relief valve out of adjustment or damaged.	If adjustable, adjust relief valve or replace.
Relief valve vent before 120 psig.	Relief valve out of adjustment.	If adjustable, turn spring retainer clockwise or replace.
Relief valve vent after 140 psig.	Relief valve out of adjustment.	If adjustable, turn spring retainer counterclockwise or replace.
Relief valve fails to vent 100 lpm at 140 psig.	Relief valve out of adjustment.	If adjustable, adjust relief valve to open closer to lower open pressure or replace.

NOTE

Index numbers in parentheses for the E-2C Emergency Oxygen System refer to figure 8-13.

Index numbers in parentheses for purging unit model A/M26M-3 refer to figure 8-6.

The E-2C Emergency Oxygen System shall be purged during each calendar inspection, when contamination is suspected, or when the system has been empty for more than two hours.

1. Pull manual oxygen release assembly (40) to ensure emergency oxygen system is depleted of all oxygen.

2. Remove two supply lines (14) from purge unit cabinet. Connect one end of each supply line (14) to nitrogen supply cylinders and the other end to the supply inlet connection (22) of purge unit.

3. Remove insulated hose (15) from purge unit cabinet. Connect quick disconnect (18) of insulated hose (15) to system (A) quick disconnect (19) of purge unit.

4. Connect filler adapter to B-nut (23) of insulated hose (15).

5. Turn purge unit 3-way valve (20) to system (A) position.

6. Ensure power switch (5) is OFF.

7. Remove power cable (17) from purge unit cabinet and plug into 110 volt outlet.

8. Open both nitrogen supply cylinder valves.

9. Open hand shutoff valve (1) and (3). High pressure gage (4) will indicate nitrogen supply cylinder pressure.

10. Connect filler adapter and insulated hose (15) to filler valve (29) of E-2C emergency oxygen system.

11. Turn power switch (5) to ON position. Power on light (6) should illuminate.

12. Turn pressure regulator (11) clockwise until 120 psig is indicated on low pressure gage (2).

13. Observe heater on light (7). When light cycles from on to off the purging unit is ready for use.

14. Reset pressure reducer assembly toggle (38) and allow E-2C Emergency Oxygen System cylinders (11) to fill to 120 psig.

15. Pull E-2C Emergency Oxygen System manual release (40) to deplete system of pressure.

16. Reset pressure reducer assembly toggle (38).

17. Repeat steps 14, 15, and 16 two more times.

18. Pull E-2C Emergency Oxygen System manual release (40) and allow heated nitrogen to free flow for 10 minutes.

19. When purging is complete, turn purge unit power switch (5) to OFF.

20. Close nitrogen supply cylinder valves.

21. Observe low pressure gage (2) and high pressure gage (4) until they indicate 0 psig. Back out counterclockwise on pressure regulator (11).

22. Close hand shutoff valves (1) and (2).

23. Disconnect filler adapter and insulated hose (15) from filler valve (29) of E-2C emergency oxygen.

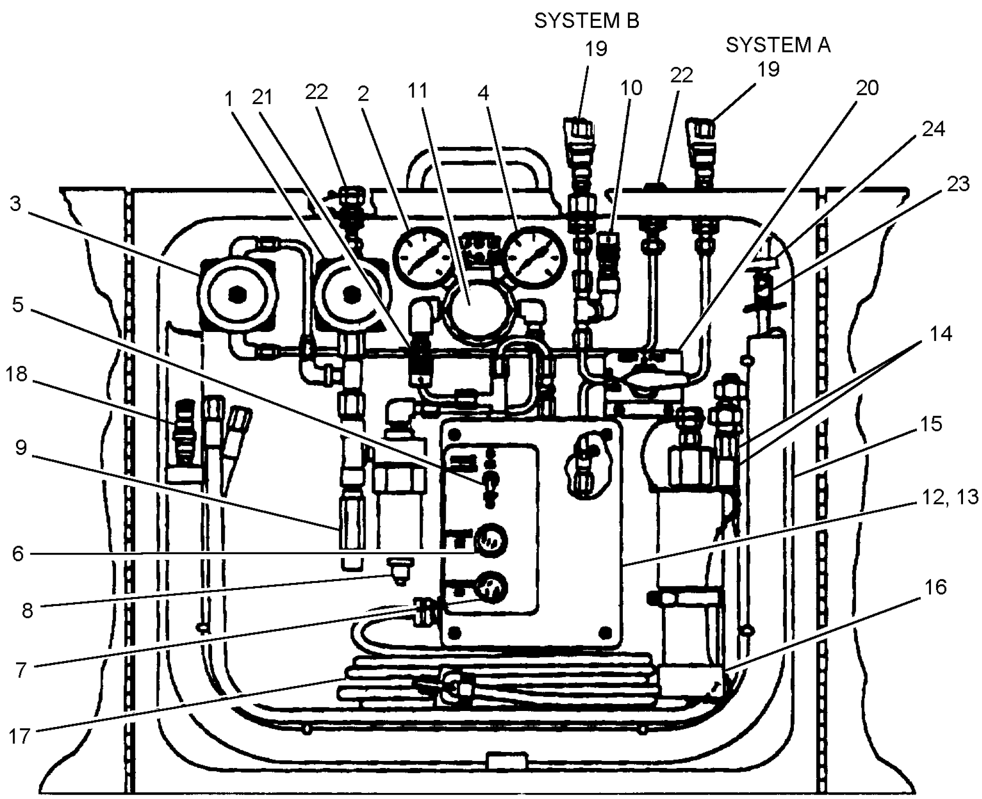
24. Disconnect insulated hose (15) from purging unit system (A) quick disconnect (19).

25. Stow all lines and accessories and secure from purging.

26. Ensure all purge gas (nitrogen) has been depleted from the Emergency Oxygen System.

27. Reset pressure reducer assembly toggle (38).

28. Immediately charge the Emergency Oxygen System with aviator's breathing oxygen in accordance with paragraph 8-34.



Description	Function
1. Hand Shutoff Valve	Controls Supply Gas Flow
2. Low Pressure Gage	Indicates Delivery Gas Pressure (0-200 PSIG)
3. Hand Shutoff Valve	Controls Supply Gas Flow
4. High Pressure Gage	Indicates Supply Gas Pressure (0-4000 PSIG)
5. Power Switch	Master On/Off Switch/Circuit Breaker
6. Power On Light	Indicates Master Switch is On and Set is Operational
7. Heater On Light	Indicates Operation of Heater
8. Priority Valve	Stops Gas Flow When Supply Gas Pressure Falls Below 200 PSIG
9. Relief Valve	Relieves Supply Pressure Exceeding 3750 PSIG
10. Low Pressure Relief Valve	Relieves Service Line Supply Pressure Exceeding 705 PSIG
11. Pressure Regulator Assembly	Regulates Pressure to 0-200 PSIG
12. Temperature Control Switch (Under Plate)	Cycles Off and On to Control Exit Gas
13. High Temperature Shutdown (Under Plate)	Shuts Off Heater when Heater Block Temperature Reaches 285°F
14. Supply Line	Connects Supply Cylinders to Housing Assembly
15. Insulated Hose Assembly	Connects Housing Assembly
16. Filler Valve	Connects Insulated Hose Assembly to Converter
17. Power Cable	Connects Unit to Electrical Power
18. Quick Disconnect	Connects Insulated Hose to 19 System A or B
19. Quick Disconnect	Connection for Insulated Hose to 19 System A or B
20. 3-Way Valve	Selects A or B Outlet Ports
21. High Pressure Relief Valve	Relieves Service Line Supply Pressure Exceeding 1355 PSIG
22. Supply Pressure Inlet	Connects Supply Line 14 to Purge Unit
23. B-Nut	Connects Insulated Hose to Filler Valve 16 or Adapter (Not Shown)
24. Adapter	Connects Insulated Hose to P-3 Aircraft Filler Port

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Figure 8-6. A/M26M-3 Purging Unit

8-40. CRU-79/P OXYGEN REGULATOR INSTALLATION. To install the CRU-79/P oxygen regulator (5, figure 8-13) on the pressure reducer housing (1), proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Tape, Anti-seize	MIL-T-27730
2	Strap, Tie Down	MS3367-1-0

CAUTION

Do not overtighten elbow/nipple (1) and adapter (3) when attaching these connecting parts to pressure reducer (12) and CRU-79/P regulator (6).

1. Apply two turns of anti-seize tape to tapered pipe threads of elbow (1) and screw elbow (1) into pressure reducer housing (12). Ensure elbow (1) is positioned as shown in figure 8-4.

2. Attach one end of high pressure hose (2) to the nipple end of elbow (1).

3. Apply two turns of anti-seize tape to tapered pipe threads of adapter (3). Screw adapter (3) into elbow (5) and secure in place with seal nut (4).

4. Connect inlet of CRU-79/P Oxygen Regulator to high pressure hose (2).

NOTE

Ensure cable tie is securely fastened to prevent low pressure hose from coming loose.

5. Connect low pressure hose (8) to outlet of CRU-79/P Oxygen Regulator (6) and secure in place with cable tie (7).

6. Connect adapter (10) to end of low pressure hose (8) and secure with cable tie (7).

7. Attach attachment loop and regulator pocket to CRU-79/P Oxygen Regulator (6).

8. The activity performing the bench test shall annotate a serviceable condition label with station/ship identification and date of bench test and affix label in a visible place on either oxygen supply cylinder (11).

8-41. DISASSEMBLY.

8-42. Disassemble the E-2C Emergency Oxygen System only to the extent necessary to perform required authorized maintenance. Figure 8-7 illustrates the Emergency Oxygen Pressure Reducer Tool Set. Disassemble the system as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter, Torque	T216C903-11
1	Pressure Reducer Tool Set	T216D900-3 (CAGE 30941)
1	Retaining Ring Pliers	S0100 (CAGE 79136)
1	Retaining Ring Pliers	SL0100 (CAGE 79136)
1	Tool, Seat Removal	T216B906-11
1	Tool, Jaw Guide	T216C915-11
1	Tool, Plunger Jaw	T216C913-11
1	Tool, Toggle Jaw	T269C911-11
1	Tool, Removal, Spring Pin	T216B905-1
2	Wrench, Spanner	T216B907-11

WARNING

Ensure that clothing, equipment, and work area are clean and free of dust/dirt, grease, oil, fuels, hydraulic fluids, or other combustible materials or hydrocarbons. Fire and/or explosion may result if even slight traces of these materials come in contact with oxygen under pressure.

NOTE

Maintenance personnel shall thoroughly familiarize themselves with each step before performing that step.

1. Remove hose assembly (9, figure 8-13) from CRU-79/P oxygen regulator (5) by removing tie down strap (8) and disengaging hose from regulator.

2. Disconnect high pressure hose (2) from elbow (6) and remove elbow (6) from pressure reducer housing (1).

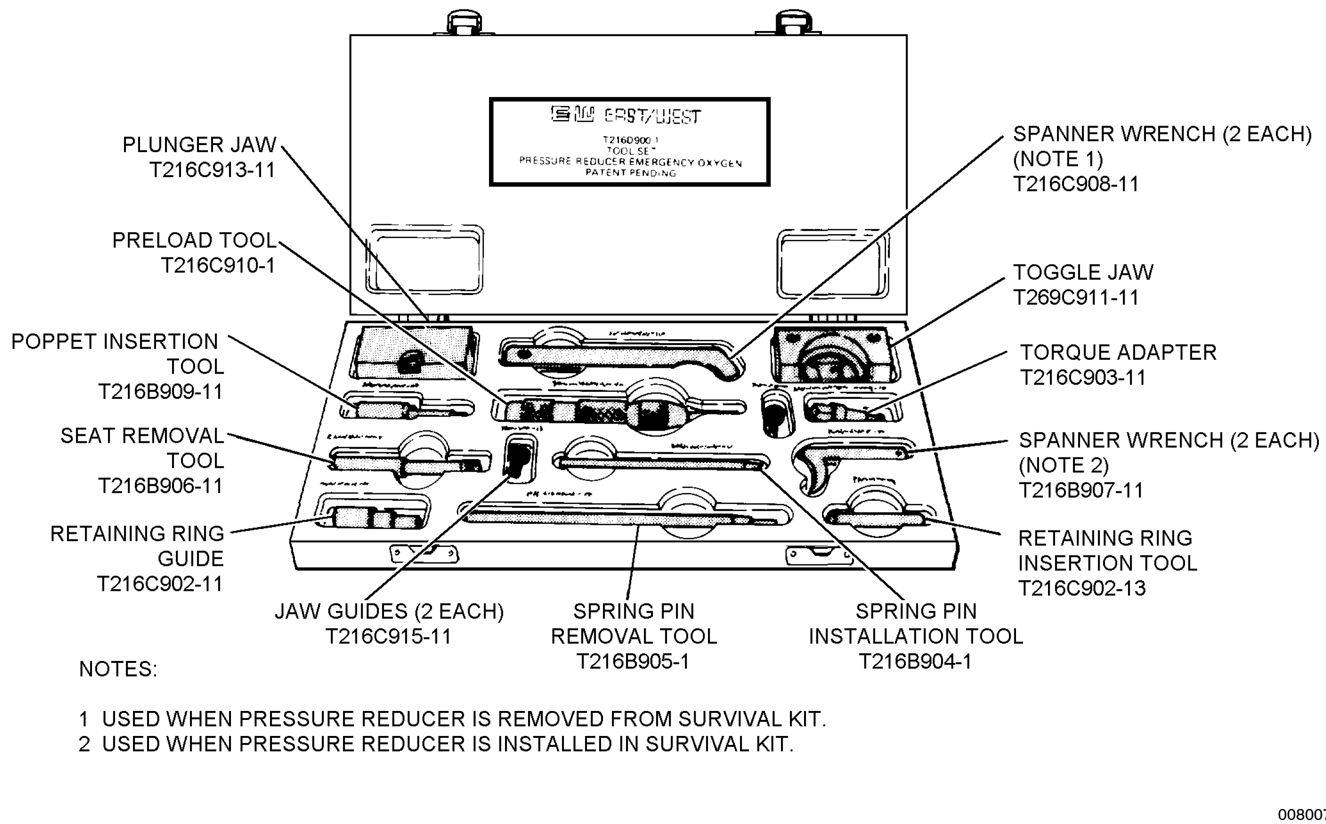

Figure 8-7. Emergency Oxygen Pressure Reducer Tool Set

3. Disconnect high pressure hose (2) from straight pipe tube adapter (3).

4. Remove self-locking nut (55), loosen loop clamp (54), and disengage manual release assembly (40) from its secured position.

5. Back off captive screws (52), loosen clamps (53) sufficiently to separate the emergency oxygen system from bracket assembly (51).

6. Remove oxygen supply cylinders (11) from pressure reducer housing (1) and plug the open ports in pressure housing using O-ring (MS28778-03) and plug (P/N EW61001) to prevent contaminants from entering.

7. Remove pressure gage (49).

8. Remove toggle shield (31) by removing nut (33) and screw (32).

9. Using two spanner wrenches remove complete adjusting assembly (34 thru 45) by unscrewing lockring (42) and adjusting cap (41).

NOTE

Do not disassemble the adjusting assembly unless replacement of parts is necessary. See step 16 for disassembly of the adjusting assembly.

10. Use retaining ring pliers (P/N SL0100) to remove retaining ring (46).

11. Remove piston (47) and O-ring (48) from pressure reducer housing (1) by gently prying upward with retaining ring pliers (P/N SL0100).

12. Remove relief valve assembly (24) and O-ring (25) from pressure reducer housing (1).

13. Remove screw (27), cap assembly (28), retaining bracket (30), and filler valve assembly (29).

14. Remove three plugs (14) and O-rings (15).

15. Remove the pressure reducer assembly as follows:

NOTE

Retaining ring (16), filter (17) and poppet guide (18) normally separate from pressure reducer housing (1) with retainer (21).

a. Using torque adapter, remove retainer (21) from pressure reducer housing (1).

b. Remove poppet spring (19), poppet (20), and backup ring stop (22).

CAUTION

When using seat removal tool to remove seat (23), use care not to damage pressure reducer housing (1).

c. Insert seat removal tool.

d. Rotate seat removal tool until seat (23) is loosened from pressure housing sealing groove.

e. Using retaining ring pliers (P/N S0100), remove retaining ring (16) from retainer (21).

f. Remove filter (17) and poppet guide (18) from retainer (21).

NOTE

Do not perform step 16 unless replacement of defective components is necessary.

16. To disassemble the manual release and adjusting assembly, proceed as follows:

a. Remove swaged ball end of manual release assembly (40) from toggle (38) by removing cotter pin (34).

b. Rotate toggle (38) to down (on) position.

c. Install jaw guides (two) in toggle jaw.

CAUTION

Be careful not to damage cable and swaged ball when performing step d.

d. Position adjusting assembly in the toggle and plunger jaws and place in a bench vise (figure 8-8); tighten vise to relieve tension on spring (44).

e. Using spring pin removal tool remove spring pin (37) from toggle (39).

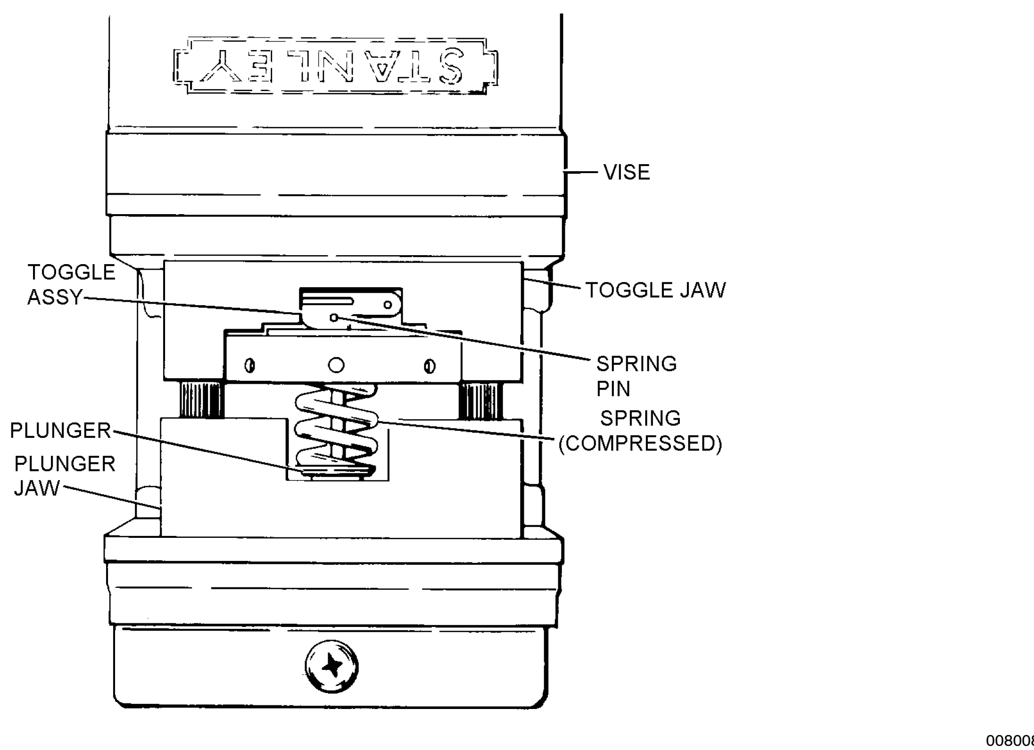

Figure 8-8. Spring Pin Removal

CAUTION

Adjusting assembly is under spring tension. When loosening the vise, hold toggle and plunger jaws to prevent loss of parts.

f. Release vise pressure, remove adjusting assembly, and disassemble toggle (38), spacer (39), manual release assembly (40), adjusting cap (41), piston guide (43), spring (44), and plunger (45).

17. Remove nipples (12) and O-rings (13) from pressure reducer housing (1).

8-43. CLEANING.

8-44. To clean the E-2C Emergency Oxygen Assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
1	Brush, Soft Bristle	—
As Required	Cloth, Lint-free, Type II	MIL-C-85043
1	Wash Bottle	MS36070A
As Required	Bag, Plastic	MIL-B-117
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411

WARNING

Do not use oil, or any material containing oil, in conjunction with oxygen. Oil, even in minute quantity, coming in contact with oxygen can cause explosion or fire. Dust, lint, and fine metal particles are also dangerous contaminants.

1. Clean all metallic parts in accordance with procedures outlined in Chapter 4 of this manual. Blow dry using oil-free nitrogen.

2. Clean all silicone rubber parts using distilled water and blow dry using oil-free nitrogen.

3. After cleaning, all surfaces shall be examined for cleanliness. Should further contamination be found, reclean in accordance with steps 1 and 2.

4. Cleaned parts shall be sealed in plastic bags for storage. Bag all complete assemblies that are not immediately returned to service.

8-45. INSPECTION OF DISASSEMBLED PARTS.

8-46. Inspect disassembled component parts in accordance with table 8-8.

8-47. REPAIR.

8-48. Repair of the E-2C Emergency Oxygen System is limited to the replacement of defective parts.

Table 8-8. Inspection of Disassembled Components

Note: Index numbers in this table refer to figure 8-13.		
REPLACE ALL PARTS THAT DO NOT PASS INSPECTION		
Nomenclature	Figure and Index Number	Inspect For
Pressure Reducer Housing	-1	Stripped threads, corrosion, and other obvious damage.
High Pressure Hose	-2	Fraying, contamination, and good condition.
Screws	-3, -27 and -32	Stripped threads, rounded hexagon flats, stripped screw heads, corrosion, and other damage.
Plug	-14 and -26	
Nuts	-33, -25 and -36	
Washers	-4	Damage and corrosion.

Table 8-8. Inspection of Disassembled Components (Cont)

Nomenclature	Figure and Index Number	Inspect For
Nipple/Elbow and Nipple Union	-6 and -12	Blocked drill hole, stripped threads, and corrosion damage.
Clamps and Clamp Covers	-7 and -8	Broken teeth, damage, and corrosion.
Hose Assembly	-9	Cuts, tears, bends, damage, and contamination.
Adapter Assembly	-10	Broken J blocks, corrosion, dents, and other damage.
Oxygen Cylinders	-11	Legibility of marking, proof test marking, corrosion, dents, stripped threads, other damage.
Retaining Rings	-16 and -46	Corrosion, bends, good condition.
Springs	-19 and -44	Bends, cracks, corrosion, and condition.
Filter	-17	Corrosion and condition.
Poppet Guide, Poppet and Backup Ring Stop	-18, -20 and -22	Nicks, burrs, bends, cracks, corrosion, good condition.
Seat	-23	Tears and condition.
Relief Valve	-24	Stripped threads, corrosion, good condition.
Cap Assembly	-28	Attachment security of chain, stripped threads, corrosion, dents, good condition.
Filler Valve	-29	Stripped threads, nicks, burrs, dents, corrosion, good condition.
Retaining Bracket	-30	Rounded hexagon flat, corrosion, good condition.
Toggle Shield	-31	Dents, bends, corrosion, good condition.
Toggle and Spacer	-38 and -39	Dents, bends, corrosion, good condition.
Manual Release Assembly	-40	Broken cable strands, housing dents, bends, burrs, security attachment of swaged ball and green ball, corrosion, stripped threads, good condition.
Adjusting Cap and Lock Ring	-41 and -42	Stripped threads, dents, bends, corrosion, nicks, burrs, good condition.
Piston Guide and Plunger	-43 and -45	Nicks, burrs, bends, dents, corrosion, good condition.
Piston	-47	Holes, dents, corrosion, other obvious damage.
Pressure Gage	-49	Legibility of markings, stripped threads, corrosion, good condition.
Name Plate	-50	Legibility or markings, good condition.

8-49. ASSEMBLY.

8-50. To assemble the E-2C Emergency Oxygen System, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Krytox 240 AZ	MIL-G-27617 (CAGE 81349)
As Required	Tape, Anti-seize	MIL-T-27730
As Required	Leak Detection Compound, Type 1	MIL-L-25567

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter, Torque	T216C903-11
1	Pliers, Retaining Ring	S0100 (CAGE 79136)
1	Pliers, Retaining Ring	SL0100 (CAGE 79136)
1	Pressure Reducer Tool Set	T216D900-3 (CAGE 30941)
1	Tool, Jaw Guide	T216C915-11
1	Tool, Plunger Jaw	T216C913-11
1	Tool, Toggle Jaw	T269C911-11
1	Tool, Installation, Spring Pin	T216B904-1
1	Tool, Insertion, Poppet	T216B909-11
1	Tool, Guide, Retaining Ring	T216C902-11
1	Wrench, Spanner	T216C902-13
1	Torque Wrench 0-150 in-lb	TE-6FUA (CAGE 55729) or equivalent

1. Assemble the manual release and adjusting assembly using the following procedures:

a. Install jaw guides into toggle jaw.

b. Place toggle jaw and plunger jaw in a bench vise (figure 8-9).

c. Loosely assemble plunger (45, figure 8-13), spring (44), piston guide (43), adjusting cap (41), spaced assembly (39), and toggle (38), and position assembled parts in toggle jaw and plunger jaw.

CAUTION

Be careful not to apply too much vise pressure and cause damage to assembled parts.

d. Apply vise pressure to compress spring (44) and align spring pin (37) holes in toggle (38) and plunger (45) (figure 8-9).

e. Insert spring pin (37) into aligned holes in toggle (38) and plunger (45) using spring pin installation tool. Insert spring pin as far as installation tool will permit. Remove installation tool and gently drive the spring pin the rest of the way in to firmly seat in toggle (38) using a drift pin.

f. Slowly open vise jaws and ensure the adjusting assembly is properly secured before removing the assembly from the toggle and plunger jaws.

g. Rotate toggle (38) to the up (off) position.

h. Attach manual release assembly (40) to spacer (39) and secure with nuts (35) and (36).

i. Insert cable and swaged ball end of manual release assembly (40) in toggle (38) and secure with cotter pin (34).

2. Position retainer (21) on a clean surface with threaded portion down. Place backup ring stop (22) on the retainer with grooved surface facing up (figure 8-10).

3. Place seat (23, figure 8-13) on top of backup ring stop (22) ensuring proper alignment within retainer groove (figure 8-11). Press firmly on seat with finger so seat is retained in place.

4. Holding retainer (21) upright, with backup ring stop (22) and seat (23) in place, screw into pressure housing (1).

5. Using torque adapter mounted on a 3/8-inch nut driver, install retainer (21) in pressure reducer housing (11). Visually inspect through open end of retainer (21) for proper alignment of backup ring stop (22) and seat (23).

6. Torque retainer (21) to 32 to 35 in-lb using torque adapter and torque wrench.

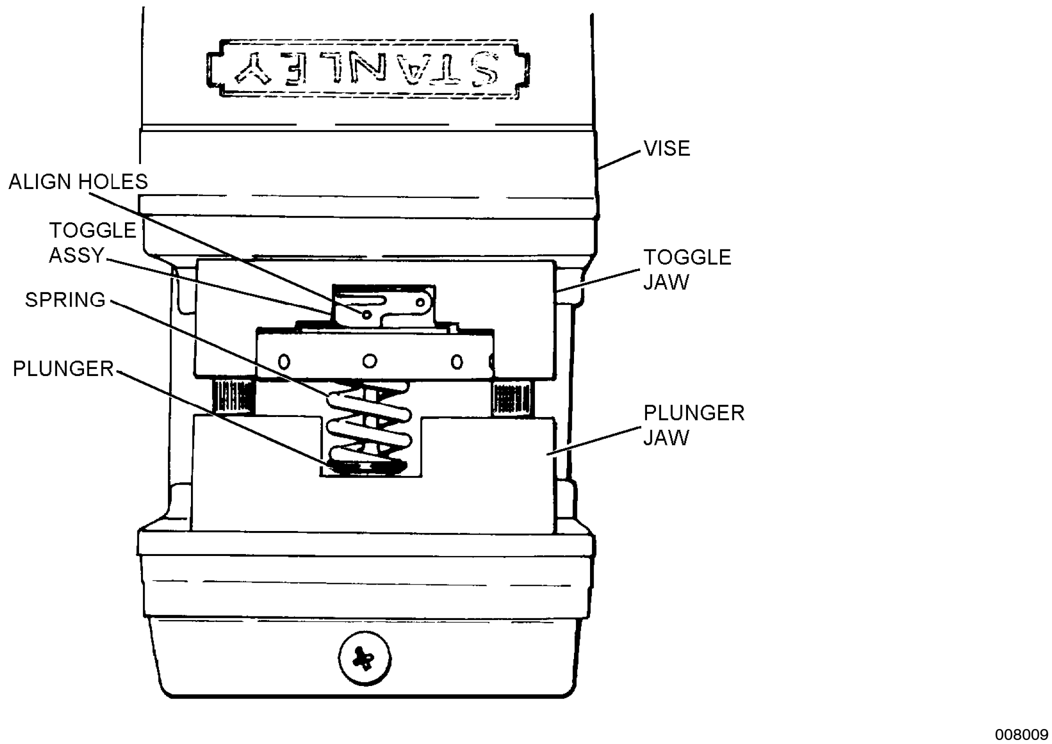

Figure 8-9. Manual Release and Adjusting Assembly Reassembly

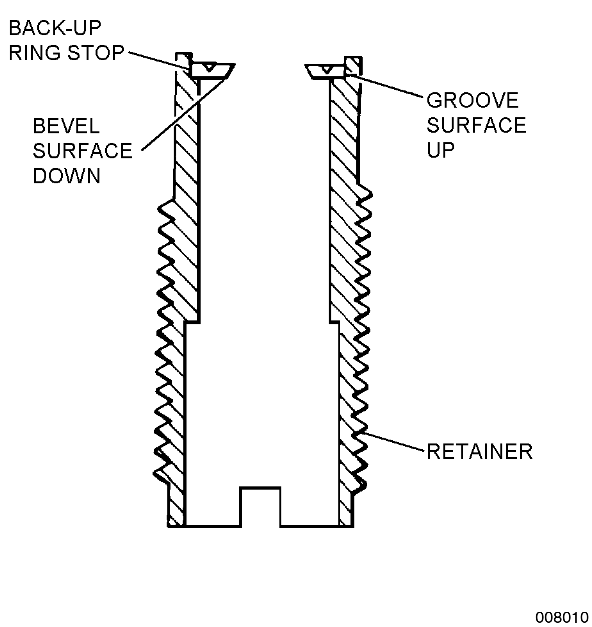

Figure 8-10. Back-up Ring Stop Installation

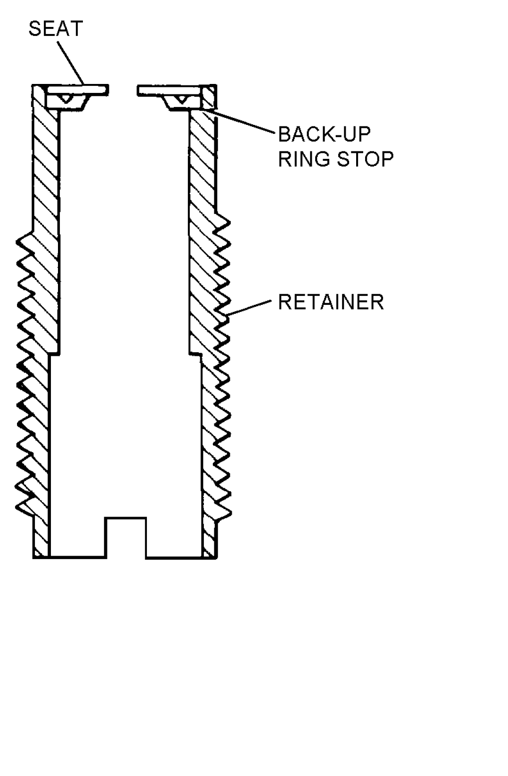

Figure 8-11. Seat Installation

7. Place poppet (20) in poppet insertion tool with cone-shaped end of poppet facing away from heavy end of insertion tool.

8. Press filter (17), with coarse mesh up, into poppet guide (18).

9. Press poppet guide spring (19) onto shaft of poppet guide (18) firmly to ensure seating spring on shaft.

10. Position retaining ring guide in retainer (21) so tool engages tangs of retainer.

11. Using retaining ring insertion tool, ensure poppet guide (18) and poppet spring (19) are properly positioned inside retainer (21).

12. Remove retaining ring insertion tool and retaining ring guide from retainer and pressure housing.

13. Check to ensure that when properly installed, the filter end of the poppet guide (18) extends slightly above the end of the retainer (21).

14. Using retaining ring pliers (P/N S0100), install retaining ring (16) inside tangs of retaining ring guide.

15. Insert retaining ring guide into tangs of retainer (21). Insert retaining ring insertion tool into retaining ring guide.

16. Compress poppet spring (19) and seat retaining ring (16) by pressing down on retaining ring insertion tool until flush with top of retaining ring guide.

17. Remove retaining ring guide and retaining ring insertion tool and ensure that retaining ring (16) is properly seated in groove.

18. Install O-ring (48) on piston (47) and lubricate O-ring (47) with Krytox 240 AZ.

19. Insert piston (47) with O-ring (48) into pressure reducer housing (1) and secure with retaining ring (46) using retaining ring pliers (P/N SL0100).

20. Install lock ring (42), then manual release and adjusting assembly (40) on pressure reducer housing (1).

21. Apply teflon tape to threads of pressure gage (49) and install pressure gage on pressure reducer housing (1).

22. Apply Krytox 240 AZ to O-rings (15) in three places and install O-rings on plugs (14) in three places.

23. Install plugs (14) with O-rings (15) in pressure reducer housing (1) in three places.

24. Apply Krytox 240 AZ on O-ring (25) and install O-ring on relief valve (24).

25. Install relief valve (24) with O-ring (25) on pressure reducer housing (1).

26. Apply teflon tape to threads of filler valve (29).

27. Install filler valve (29) in pressure reducer housing (1).

28. Place retaining bracket (30) over filler valve (29) ensuring that retaining bracket is fitted over the hexagon flats of the filler valve.

29. Secure retaining bracket (30) and filler cap assembly (28) security chain to pressure housing using screw (27).

30. Apply teflon tape to threads of plug (26) and install plug in pressure reducer housing (1).

8-51. POST ASSEMBLY ADJUSTMENT AND LEAKAGE TEST OF PRESSURE REDUCER ASSEMBLY.

8-52. Post assembly adjustment and leakage test shall be performed using oxygen system components test stand models 1172AS100 or 1316AS100. Refer to test stand ground support equipment manual (NAVAIR 17-15BC-21) for identification of the controls and indicators referred to during test procedures.

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275
As Required	Leak Detection Compound, Type 1	MIL-L-25567
As Required	Tape, Anti-seize	MIL-T-27730
As Required	Krytox 240 AZ	MIL-G-27617 (CAGE 81349) NIIN 01-007-4384
2	Strap, Tie Down	MS3367-1-0

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter, Filler	T186C100-1 (CAGE 30941)
1	Pressure Reducer Tool Set	T216D900-3 (CAGE 30941)
1	Regulator, Pressure	283028-0001 (CAGE 99657) NIIN 01-101-8827 or equivalent
1	Wrench, Spanner	T216C902-13

8-53. To perform the Post Assembly Adjustment and Leak Test, proceed as follows:

NOTE

Due to the complexity of each of the test stands, 1172AS100 and 1316AS100, it is essential that the operator become thoroughly familiar with the test stand to be used prior to performing bench tests.

1. Using the vent flow graph supplied with the test stand in use, convert a 100 lpm flow to inches of water.

WARNING

Because of the possibility of vacuum pump explosion, only water-pumped nitrogen, Type I, Class I, Grade B shall be used.

Oxygen test stands and purging equipment shall use nitrogen only from gray cylinders marked NITROGEN OIL-FREE in white letters with two 3-inch wide black bands marking the tops. Do not use 3500 psig nitrogen cylinders. These cylinders cannot be certified contaminant free.

NOTE

Nitrogen supply cylinders used in testing oxygen components contain a maximum of 1800 psig. For tests requiring 1800 psig, use highest available pressure, but in no case shall this pressure be less than 500 psig.

2. Connect pressure regulator to nitrogen supply and connect filler adapter to the pressure regulator.

3. Cap oxygen supply cylinder ports of pressure reducer housing (1, figure 8-13) with plug (P/N EW61001) and O-ring (MS28778-03) in two places.

NOTE

Adjusting cap (41) must be screwed clockwise all the way down and lock ring (42) must be loose.

4. Connect filler adapter to filler valve assembly (29).

5. Ensure all test stand valves are properly secured, then connect outlet port of pressure reducer assembly (1) to the nitrogen (N_2) input connection (18) of test the stand.

6. Turn inlet pressure ON/OFF valve (L) of the test stand to the ON position.

7. For Model 1172AS100 and 1316AS100 test stands only: Turn flow selector valve (M) to simulator position.

8. Ensure toggle (38) of pressure reducer assembly is in the up (off) position.

9. Using regulated nitrogen supply source, slowly apply 250 psig to pressure reducer assembly.

10. Observe test stand nitrogen input pressure gage (27) to ensure that there shall be no leakage indicated. If leakage is indicated, refer to table 8-9 for malfunction troubleshooting and remedies.

WARNING

Prior to usage, inspect condition of leak detection compound. If compound is not clear and free of suspended material/sediment, it is considered contaminated and shall be disposed of. Compound having peculiar odors such as acetate or alcohol is considered contaminated and shall be disposed of.

Use leak detection compound sparingly to avoid penetration and contamination of the oxygen system.

11. Using leak detection compound, ensure that there is no leakage around three plugs (13, figure 8-13), plug (26), filler valve (29), and pressure gage (49). If any leakage is detected, refer to table 8-9 for malfunction troubleshooting and remedies.

Table 8-9. Troubleshooting (Post Assembly Adjustment and Leakage Test)

Trouble	Probable Cause	Remedy
Pressure reducer outlet port leaks when in off position.	Poppet assembly leaking.	Replace seat, poppet.
Leak around pressure gage.	Loose installation or stripped threads.	Tighten or replace pressure gage.
Leak around plugs.	Bad O-ring, loose plug, stripped threads.	Replace O-ring, tighten or replace plug.
Leak around filler valve.	Loose valve or stripped threads.	Tighten or replace valve.

NOTE

Nitrogen supply cylinders used in testing oxygen components contain a maximum pressure of 1800 psig. For tests requiring 1800 psig, use highest pressure available, but in no case shall this pressure be less than 500 psig.

12. Using regulated nitrogen supply source, slowly increase pressure to pressure reducer assembly (I) to 1800 psig.

13. Repeat steps 10 and 11 above.

14. Actuate manual release assembly (40, figure 8-13). Observe nitrogen input pressure gage (27) on test stand to ensure that pressure indication is 45 to 80 psig. If the nitrogen input pressure gage does not indicate 45 to 85 psig, perform steps a or b below, as applicable.

NOTE

When performing steps a and b, pressure reducer assembly toggle (38) must be in the up (off) position before making adjustment and in the down (on) position to check adjustment.

a. If indicated pressure is below 45 psig, use spanner wrench to turn adjusting cap (41) clockwise until 70 psig is indicated on the test stand nitrogen input pressure gage (27). Upon completion of adjustment, tighten lock ring (42).

b. If indicated pressure is above 80 psig, use spanner wrench to turn adjusting cap (41) counter clockwise until 70 psig is indicated on the test stand nitrogen input pressure gage (27). Repeat as necessary. Upon completion of adjustment, tighten lock ring (42).

15. Open vent pressure valve (H) on test stand until 100 lpm flow is indicated on vent flow manometer (3). Nitrogen input pressure gage shall indicate 45 to 80 psig. If the nitrogen input pressure gage does not indicate 45 to 80 psig, perform step 14a or 14b above, as necessary.

16. Vent pressure regulator until regulated nitrogen supply source to pressure reducer assembly (1) is 250 psig.

17. With 100 lpm flow still indicated on test stand vent flow manometer (3), nitrogen input pressure gage (27) shall indicate 45 to 80 psig. If the input pressure gage does not indicate 45 to 80 psig, perform step 14a or 14b, above as necessary.

18. Close test stand vent pressure valve (H). Nitrogen input pressure gage (27) shall indicate 45 to 80 psig. If 45 to 80 psig is not indicated perform step 14a or 14b, as necessary.

19. Secure regulated nitrogen supply source to pressure reducer assembly (1). Open system bleed valve(s) and bleed pressure from the test stand.

20. Secure all test stand valves and disconnect pressure reducer assembly (1) from regulated nitrogen supply source and test stand.

21. Remove plugs (P/N EW61001) and O-rings (MS28778-03) (two places) from oxygen supply cylinder ports of pressure reducer housing (1).

22. Apply Krytox 240 AZ to O-rings (13) and install O-rings on nipple unions (12).

23. Apply anti-seize tape to threads on opposite end (cylinder end) of nipple unions (12).

24. Install O-ring side of nipple union (12) in supply cylinder ports of pressure housing (1).

25. Install oxygen supply cylinders (11) on nipple unions (12).

26. Position pressure reducer assembly, with oxygen supply cylinders (11, figure 8-13) attached, in bracket assembly (51).

27. Ensure bottom of cylinders (11) extends 5/16 inch below bracket assembly (51) and heads of screws (52) are positioned 1/2 inch from edge of bracket assembly (51) (figure 8-12).

28. Tighten screws (52) to secure unit in bracket assembly.

29. Stow manual release assembly (40) in clamp (54) and secure with screw (56) and locknut (55).

30. Perform bench test on completely assembled E-2C emergency oxygen system in accordance with paragraph 8-31.

NOTE

Elbow (6), CRU-79/P regulator (5), and hose (9) will be installed on the E-2C emergency oxygen system at the completion of bench test.

31. Apply antiseize tape to tapered pipe threads of elbow (6) and install elbow (6) into pressure reducing housing (1) at approximately 45 degree angle.

32. Screw high pressure hose (2) on to elbow (6).

33. Screw seal nut (4) onto tapered pipe thread end of adapter (3), then apply antiseize tape to tapered pipe threads of adapter (3).

34. Screw nipple end of adapter (3) onto high pressure hose (2).

35. Screw seal nut (4) onto tapered pipe threads of elbow (7), then apply antiseize tape to tapered pipe threads of adapter (7).

36. Screw adapter (7) into CRU-79/P oxygen regulator (5) with female end centered facing up towards top of regulator (5). Tighten seal nut (4) down on regulator (5).

37. Screw high pressure hose (2) and adapter (3) onto elbow (7) and tighten seal nut (3).

38. Attach small diameter end of low pressure hose (9) to CRU-79/P oxygen regulator (5) outlet and secure tightly with strap tie (8) or clamp (8).

39. Attach hook fastener attachment loop (57) around low pressure hose (9).

40. Attach adapter (10) to low pressure hose (9) and secure tightly with strap tie (8) or clamp (8).

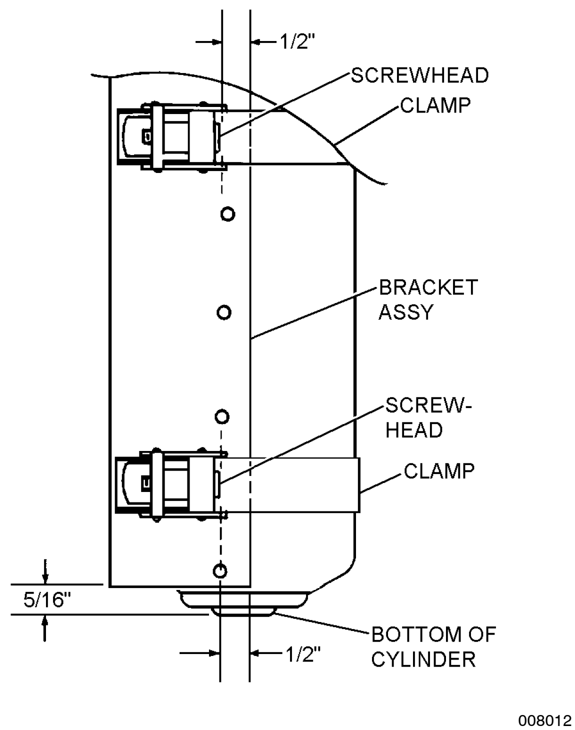

Figure 8-12. Bracket Assembly Installation Dimensions

Section 8-5. Illustrated Parts Breakdown

8-54. GENERAL.

8-55. This section provides an illustrated parts breakdown of the assemblies and detail parts of the Emergency Oxygen System (P/Ns 269D200-3 and 269D200-5).

8-56. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

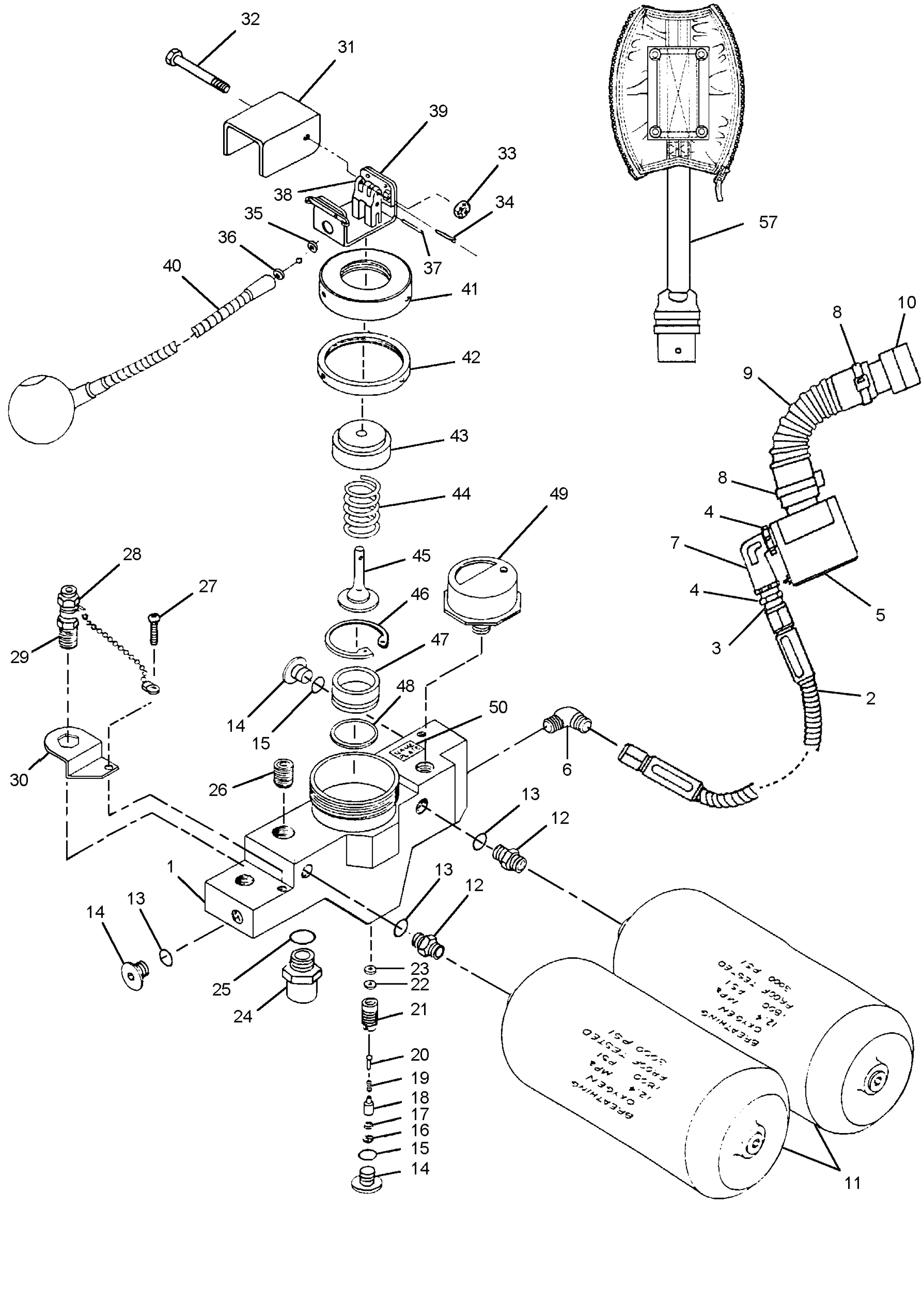

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Figure 8-13. E-2C Emergency Oxygen System Installation (Sheet 1 of 2)

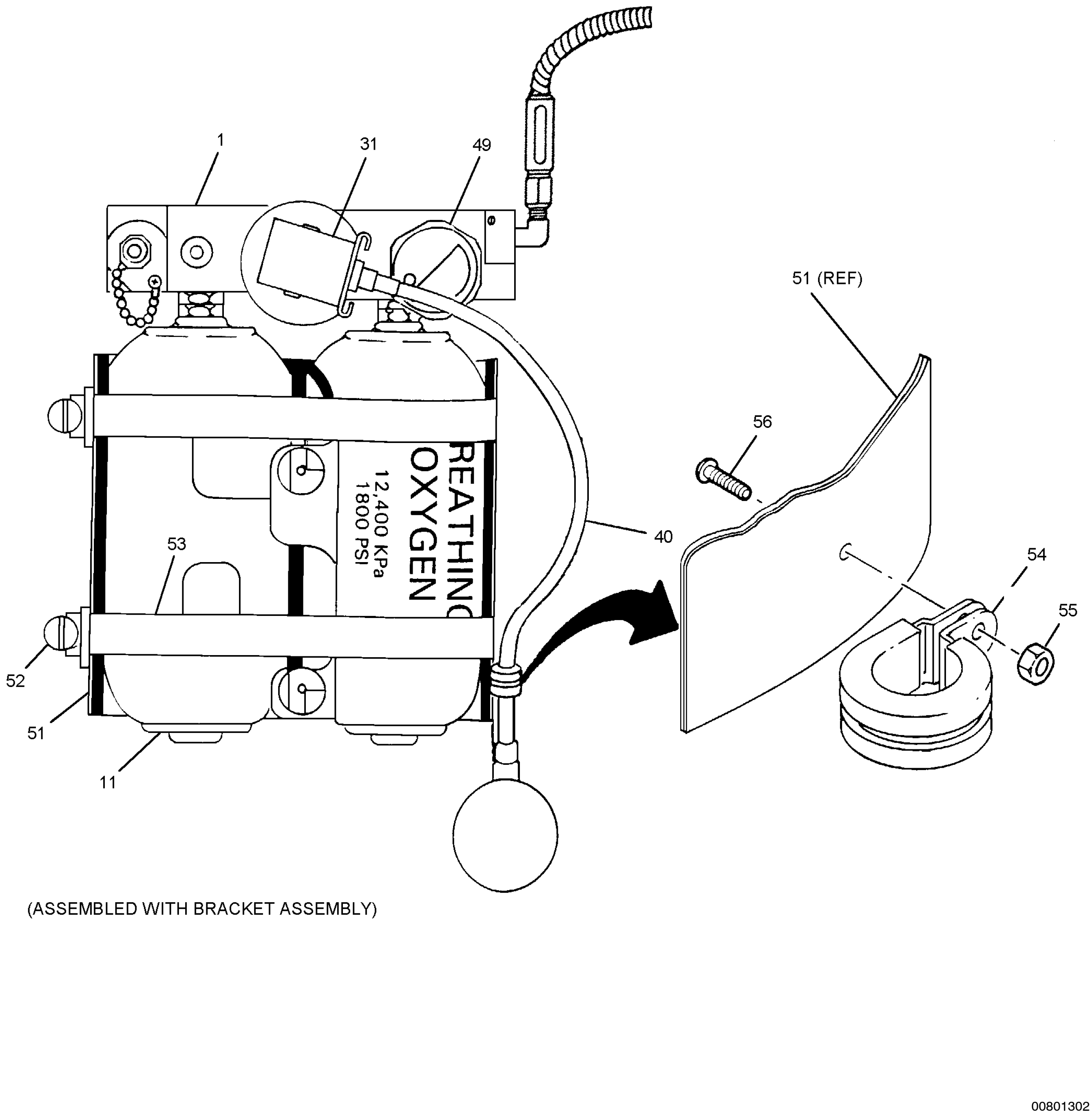


Figure 8-13. E-2C Emergency Oxygen System Installation (Sheet 2 of 2)

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
8-13	269D200-3	E-2C EMERGENCY OXYGEN SYSTEM	REF	A
	269D200-5	E-2C EMERGENCY OXYGEN SYSTEM	REF	B
-1	269J811-11	. HOUSING, Pressure Reducer	1	
-2	33C1204-080	. HOSE, High Pressure (28445)	1	A
	EW65004	. HOSE, High Pressure	1	B
-3	AN816-5D	. ADAPTER, Straight, Pipe-to-Tube	1	
-4	B122-2P2	. SEAL NUT (00-715-2761)	2	A
	269C321-11	. SEAL NUT	2	B
-5	CRU-79/P	. REGULATOR, Oxygen, Model 3260024-0101 (99251)	1	
-6	MS20822-5D	. ELBOW, Pipe-to-Tube	1	
-7	AN914-1D	. ELBOW, Pipe	1	
-8	MS3367-1-0	. STRAP, Tie Down	2	
-9	HC224-12-14-4	. HOSE ASSEMBLY, Low pressure (13560)	1	A
	EW65005	. HOSE ASSEMBLY, Low pressure	1	B
-10	EW81002	. ADAPTER ASSEMBLY	1	
-11	235D300-3	. OXYGEN CYLINDER ASSEMBLY	2	
-12	266B830-11	. NIPPLE, Union	2	
-13	MS9068-011	. O-RING	2	
-14	EW61001	. PLUG	3	
-15	MS28778-03	. O-RING	3	
-16	MS16625-4025	. RING, Retaining	1	
-17	102B19-11	. FILTER	1	
-18	102B818-11	. GUIDE, Poppet	1	
-19	102B814-11	. SPRING, Poppet	1	
-20	102B817-11	. POPPET	1	
-21	102C815-11	. RETAINER	1	
-22	102B828-11	. STOP, Backup Ring	1	
-23	102B816-11	. SEAT	1	
-24	EW63004	. RELIEF VALVE	1	
-25	MS9068-012	. O-RING	1	
-26	MS27769-52	. PLUG	1	
-27	MS51957-26	. SCREW	1	
-28	269B280-1	. CAP ASSEMBLY, Filler	1	
-29	221B380-1	. FILLER VALVE ASSEMBLY (REPL valve . . . . . core with MIL-V-8965)	1	
-30	226C870-13	. SHIELD, Toggle	1	
-31	269D821-11	. SHIELD, Toggle . . . . (ATTACHING PARTS)	1	
-32	MS51957-21	. SCREW	1	
-33	EW42017	. NUT . . . . ---*---	1	
-34	MS24665-83	. COTTER, Pin	1	
-35	221B368-15	. NUT	1	
-36	221B368-15	. NUT	1	
-37	MS171435	. SPRING, Pin	1	
-38	269C303-11	. TOGGLE	1	
-39	269D820-11	. SPACER ASSEMBLY	1	

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
8-13-40	269D360-3	. RELEASE ASSEMBLY, Manual	1	
-41	233C829-11	. CAP, Adjusting	1	
-42	233C830-11	. LOCKRING	1	
-43	233C820-11	. GUIDE, Piston	1	
-44	233B831-11	. SPRING	1	
-45	102C824-11	. PLUNGER	1	
-46	EW48001	. RING, Retaining	1	
-47	102C821-11	. PISTON	1	
-48	MS28775-117	. O-RING	1	
-49	EW68001	. GAGE, Pressure	1	
-50	269D423-11	. NAME PLATE	1	
-51	123AB50526	. BRACKET ASSEMBLY (FMSC)	1	
-52	NO NUMBER	. . SCREW	2	
-53	GC501S64	. . CLAMP, Hose	2	
-54	MS21919WDG4	. . CLAMP, Loop	1	
		(ATTACHING PARTS)		
-55	22NKTM-02	. . NUT, Self Locking	1	
-56	MS24694-S47	. . SCREW, Machine, Flush Head	1	
		---*---		
-57	—	. HOOK FASTENER ATTACHMENT LOOP . . . . . (Note 2)	1	

Notes: 1. Deleted.
2. Regulator Pocket is manufactured IAW NAVAIR 13-1-6.7-4. Attachment hoop is sewn to inside bottom of pocket with cross box stitch.

NUMERICAL INDEX

Part Number	Figure and Index Number	SM&R Code
AN816-5D	8-13-3	PAOZZ
AN914-1D	8-13-7	PAOZZ
B122-2P2	8-13-4	PAOZZ
CRU-79/P	8-13-5	PAGZZ
EW42017	8-13-33	
EW48001	8-13-46	
EW61001	8-13-14	PAGZZ
EW63004	8-13-24	PAGZZ
EW65004	8-13-2	PAGZZ
EW65005	8-13-9	PAGZZ
EW68001	8-13-49	PAGZZ
EW81002	8-13-10	PAGZZ
GC501S64	8-13-53	PAOZZ
HC224-12-14-4	8-13-9	PAOZZ
MS16625-4025	8-13-16	PAGZZ
MS171435	8-13-37	PAOZZ
MS208-5D	8-13-6	PAOZZ
MS21919WDG4	8-13-54	PAOZZ
MS24665-83	8-13-34	PAOZZ
MS24694-S47	8-13-56	PAOZZ
MS27769-52	8-13-26	
MS28775-117	8-13-48	PAGZZ
MS28778-03	8-13-15	PAGZZ
MS3367-1-0	8-13-8	PAOZZ
MS51957-21	8-13-32	PAOZZ
MS51957-26	8-13-27	PAOZZ
MS9068-011	8-13-13	PAOZZ
MS9068-012	8-13-25	PAOZZ
NO NUMBER	8-13-52	
102B19-11	8-13-17	
102B814-11	8-13-19	PAGZZ
102B816-11	8-13-23	PAGZZ
102B817-11	8-13-20	PAGZZ
102B818-11	8-13-18	PAGZZ
102B828-11	8-13-22	PAGZZ
102C815-11	8-13-21	PAGZZ
102C821-11	8-13-47	PAGZZ
102C824-11	8-13-45	PAGZZ
123AB50526	8-13-51	
22NKTM-02	8-13-55	PAOZZ
221B368-15	8-13-35	
	8-13-36	
221B380-1	8-13-29	PAGGG
233B831-11	8-13-44	PAGZZ
233C820-11	8-13-43	PAGZZ
233C829-11	8-13-41	PAGZZ
233C830-11	8-13-42	PAGZZ
235D300-3	8-13-11	PAGDD
266B830-11	8-13-12	PAGZZ
266C870-13	8-13-30	PAGZZ
269B280-1	8-13-28	
269C303-11	8-13-38	PAGZZ
269C321-11	8-13-4	PAGZZ
269D200-3	8-13	
269D200-5	8-13	
269D360-3	8-13-40	
269D423-11	8-13-50	
269D820-11	8-13-39	
269D821-11	8-13-31	
269J811-11	8-13-1	
33C1204-080	8-13-2	PAGZZ

CHAPTER 8A

E-2C EMERGENCY OXYGEN SUPPLY CRU-109/P22P-20

Section 8A-1. Description

8A-1. GENERAL.

8A-2. The E-2C Emergency Oxygen Supply (P/N 269D550-3) is manufactured by East West Industries (CAGE 30941) (figure 8A-1). The E-2C Emergency Oxygen System is designed to provide an emergency source of breathing oxygen during high altitude parachute descent. Table 8A-1 contains leading particulars for the E-2C Emergency Oxygen Supply.

8A-3. CONFIGURATION.

8A-4. The E-2C Emergency Oxygen System is supplied in one basic configuration that is designed to be incorporated into a backpack assembly which includes a parachute assembly, liferaft assembly, and survival items.

8A-5. FUNCTION.

8A-6. Design characteristics and operation of the E-2C Emergency Oxygen System are described in this paragraph.

1. When an installed system is inactive (off), high pressure oxygen (1800 to 2000 psig, full) is present from the oxygen cylinder (12, figure 8A-2) to the base of the poppet (6), and to the oxygen pressure gage (10). The oxygen pressure gage (10) indicates the amount of oxygen pressure available to the system at all times.

Table 8A-1. Leading Particulars

E-2C Emergency Oxygen Supply (P/N 269D550-3)	250 to 2100 psig
Mounting	Installed E-2C A/P22P-20 Crew Backpack Assembly
Operating Altitude Range	Up to 25,000 feet
Visual Indicator	Pressure Gage
Oxygen Cylinder	One, 47 cu. in, P/N 235D250-1
Pressure Reducer Assy	Reduces system pressure down to 45 to 80 psig
Overall Dimensions:	
Length	14.25 inches
Width	2.50 inches
Weight	TBD
Duration	Approximately 4 to 8 minutes depending on altitude

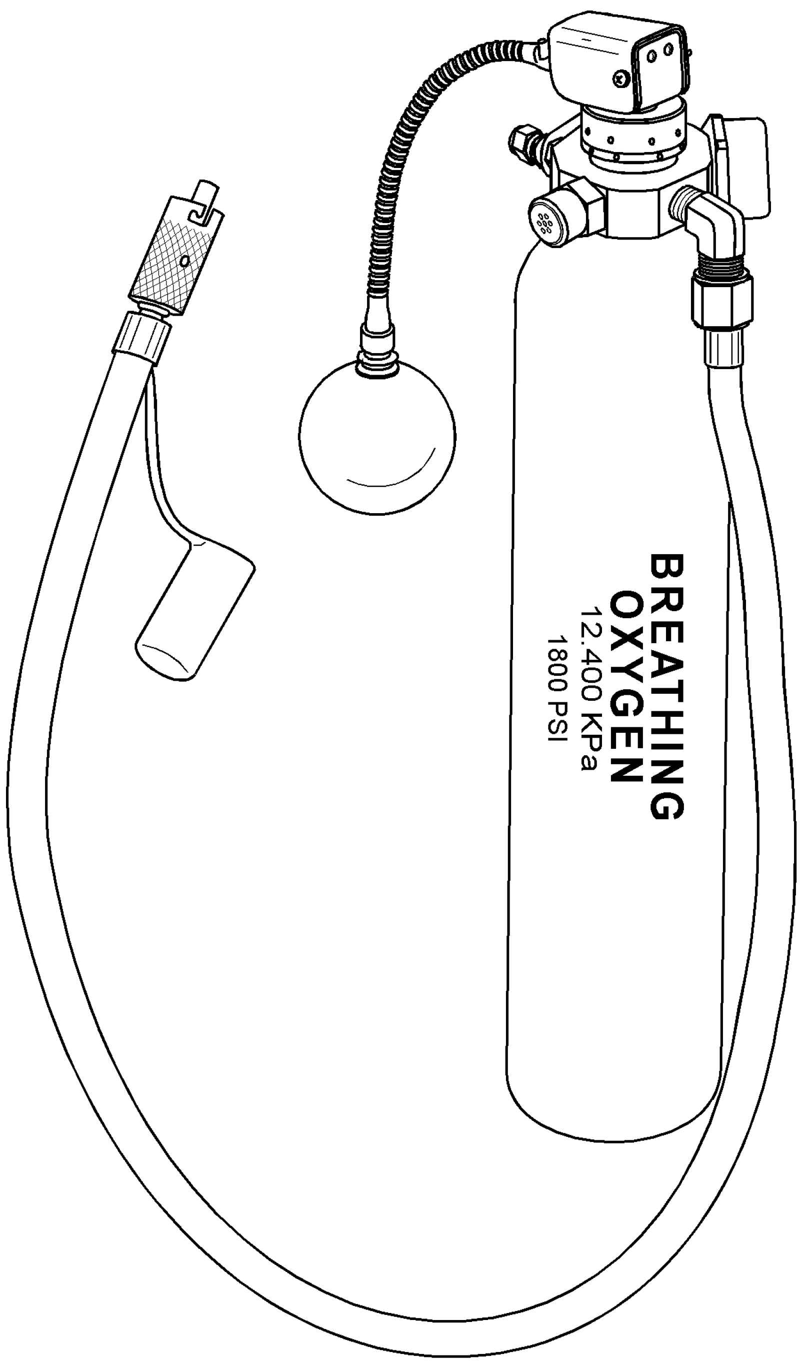
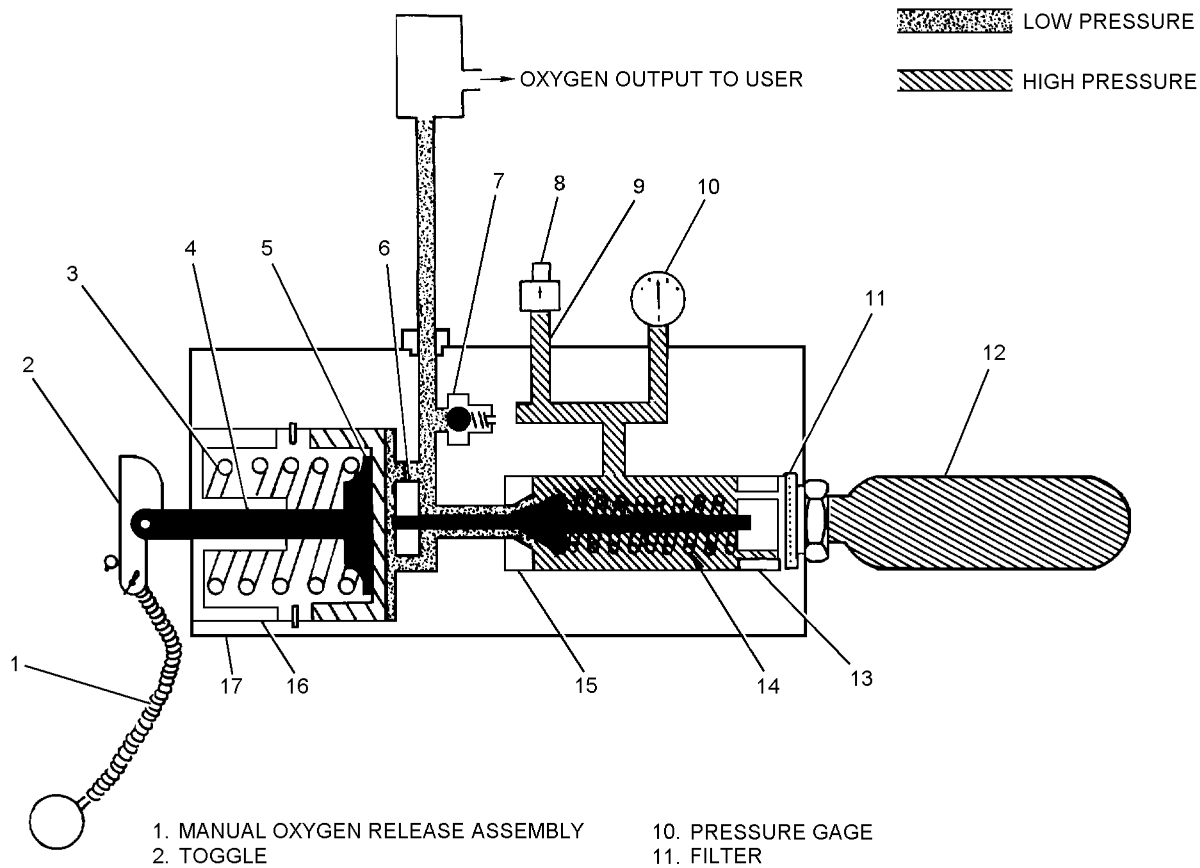


Figure 8A-1. E-2C Emergency Oxygen Supply



1. MANUAL OXYGEN RELEASE ASSEMBLY
2. TOGGLE
3. SPRING
4. PLUNGER
5. PISTON
6. POPPET
7. RELIEF VALVE
8. FILLER VALVE
9. FILTER
10. PRESSURE GAGE
11. FILTER
12. OXYGEN SUPPLY CYLINDER
13. POPPET GUIDE
14. POPPET SPRING
15. POPPET SEAT
16. PISTON GUIDE
17. PRESSURE REDUCER ASSEMBLY

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Figure 8A-2. E-2C Emergency Oxygen System Functional Diagram

2. When the manual oxygen release assembly (1) is pulled, toggle (2) will release spring (3), which forces plunger (4) down on piston (5). The force exerted on piston (5) moves poppet (6) away from the poppet seat (15) allowing reduced system oxygen pressure to flow to the relief valve (7) and to the inlet of the oxygen regulator, providing the regulator with operating pressure.

3. The relief valve (7) is a safety feature for the system. In the event of system failure, relief valve (7) opens when operating pressure reaches 120 to 140 psig. This releases excess pressure to ambient and reduces supply pressure to 45 to 80 psig.

4. An inlet pressure of 45 to 80 psig provides operating pressure for the oxygen regulator (7). The duration of breathing oxygen in a full cylinder of oxygen is approximately 4 to 8 minutes, depending on the altitude at which the system is used.

8A-7. SERVICE LIFE.

8A-8. E-2C Emergency Oxygen Systems shall remain in service as long as they continue to function properly.

Section 8A-2. Modifications

8A-9. GENERAL.

8A-10. There are no modifications to the E-2C Emergency Oxygen Supply at this time.

Section 8A-3. Performance Test Sheet Preparation

8A-11. GENERAL.

8A-12. Preparation of the Performance Test Sheet (figure 8A-3), used during Bench Test, requires entering appropriate values for indicated flows and pressures in the spaces provided on the test sheet. The indicated flow and pressure values are determined from the test stand calibration correction cards. Refer to the appropriate ground support equipment manual for the test stand in use.

8A-13. Test stand calibration correction cards are normally prepared during calibration of the test stands by converting actual flow and pressure readings to indicated flow and pressure values. Test stand calibration correction cards contain all the flow and pressure data required to test the E-2C Emergency Oxygen System. See test stand ground support equipment manual for calibration intervals.

8A-14. The Performance Test Sheet shall be prepared as shown in figure 8A-3. The Performance Test Sheet shown is a sample, but may be reproduced for local use.

8A-15. The following tests require the extraction of appropriate indicated flows and/or pressures from the test stand calibration corrections cards:

Pressure Reducer Flow Test
Relief Valve Test

NOTE

For correction card numbers refer to appropriate ground support equipment manual.

8A-16. SYSTEM PERFORMANCE TESTS.

8A-17. PRESSURE REDUCER FLOW TEST. The E-2C Emergency Oxygen Supply pressure reducer assembly shall be capable of reducing system pressure to 45 to 80 psig while delivering a 0 to 100 liters per minute (lpm) flow. Determine the following values and enter them on the Performance Test Sheet (figure 8A-3):

1. Using calibration correction card number 2, determine the indicated psig values for actual pressures 45 and 80 psig and enter the values on the performance test sheet (figure 8A-3).

PERFORMANCE TEST SHEET

E-2C EMERGENCY OXYGEN SYSTEM

DATE: ______________________ PRESS. REDUCER SERIAL NO. ______________________

TEST STAND SERIAL NO. ____________ OPERATOR: ______________________

CDI: ______________________

1. VISUAL INSPECTION: SAT __________ UNSAT ______________________

   REMARKS:

   ____

2. EXTERNAL LEAKAGE (1800 PSIG): SAT ____________ UNSAT ____________

3. ACTUATOR PULL TEST (20 ± 10 FT-LB): ______________________

4. PRESS REDUCER FLOW TEST (45-80 PSIG):

E-2 CYLINDER GAGE PRESS	DELIVERY PRESS ACTUAL	DELIVERY PRESS PG-1 INDICATED	"0" LPM	PG-1 READ	ACTUAL LPM	PG-2 IND.	PG-1 READ
1800	45		0		100		
250	80		0		100		

5. RELIEF VALVE TEST (120-140 PSIG):

ACT. PSIG	PG-1 IND	PG-1 READ	ACT. PSIG	PG-1 IND	ACT. LPM	PG-2 IND	ACT. PSIG	PG-1 IND	ACT. LPM	PG-2 IND	PG-2 READ
120			140		100		1		.01		
140											

6. EMERGENCY OXYGEN SYSTEM PURGE:

TEMPERATURE	CHARGING PRESSURE	CHARGE	DEPLETE	CHARGE	DEPLETE	FLOW 10 MIN
203°-266°F 110°-130°C	100 PSIG					

Figure 8A-3. Performance Test Sheet, E-2C Emergency Oxygen System (Sheet 1 of 2)

7. EMERGENCY OXYGEN CHARGE: (FILL TIME EACH STAGE MINIMUM 3 MINUTES WITH A 2 MINUTES COOL DOWN BETWEEN STAGES)

STAGE	PSIG
1	0-500
2	500-1000
3	1000-1500
4	1500-1800
5	1800-2000

AMBIENT AIR TEMPERATURE		CHARGING PRESSURE
°F	°C	PSIG
0	-18	1550-1750
10	-12	1600-1775
20	-7	1625-1800
30	-1	1675-1850
40	5	1700-1875
50	10	1725-1925
60	16	1775-1975
70	21	1800-2000
80	27	1825-2050
90	32	1875-2075
100	38	1900-2125
110	43	1925-2150
120	49	1975-2200
130	54	2000-2225

Figure 8A-3. Performance Test Sheet, E-2C Emergency Oxygen System (Sheet 2 of 2)

2. Using calibration correction card number 4, determine the indicated inches of water pressure (inH_2O) for actual flow of 100 lpm and enter the value on the performance test sheet (figure 8A-3).

8A-18. RELIEF VALVE TEST. The relief valve is designed to open at a pressure between 120 and 140 psig and vent pressure at a rate of at least 100 lpm with an applied pressure of 140 psig. The maximum allowable leakage with an applied pressure of 110 psig is 0.01 lpm. Determine the following values and enter them on the Performance Test Sheet (figure 8A-3):

1. Using calibration correction card number 2, determine the indicated psig for actual pressures 110, 120, and 140, and enter the values on the performance test sheet (figure 8A-3).

2. Using calibration correction card number 4, determine the indicated inches of water pressure (inH_2O) for the actual flow of 100 lpm and enter the value on the performance test sheet (figure 8A-3).

3. Using calibration correction card number 7, determine the indicated inches of water pressure (inH_2O) for the actual flow of 0.01 lpm and enter the value on the performance test sheet (figure 8A-3).

Section 8A-4. Maintenance

8A-19. GENERAL.

8A-20. This section contains the procedures for inspection, testing, troubleshooting, disassembly, cleaning, repair, assembly, and adjustment of the E-2C Emergency Oxygen Supply.

NOTE

Upon completion of any maintenance action (e.g., inspection, repair, modification, etc.) be sure to complete the required maintenance data collection system form.

8A-21. Procedural steps outlined in this section are listed under the inspection cycle in which they are required and in the sequence in which they normally occur.

8A-22. INSPECTION.

8A-23. ACCEPTANCE/TURNAROUND/DAILY/PREFLIGHT/POSTFLIGHT AND TRANSFER INSPECTION. Required Visual Inspections of aircraft, (acceptance, turnaround, daily, preflight, postflight, and/or transfer) by the responsible aircrew personnel shall include a Visual Inspection of the E-2C A/P22P-20 Crew backpack assembly whenever the assembly is installed in the aircraft being inspected.

8A-24. Any E-2C Emergency Oxygen Supply which does not pass the Visual Inspection (other than the requirement for topping-off system pressure) shall be removed from the aircraft and replaced with a ready for issue (RFI) unit.

8A-25. Visual Inspection. The Visual Inspection of the E-2C Emergency Oxygen Supply and the immediate vicinity shall include the following:

WARNING

Ensure that clothing, equipment, and work area are free of dirt, grease, oil, fuels, hydraulic fluids, or other combustible materials or hydrocarbons. Fire and/or explosion may result if even slight traces of these combustible materials come in contact with oxygen under pressure.

NOTE

Index numbers referred to reference figure 8A-4 unless otherwise noted.

1. Ensure that clothing, equipment, and work area are free of dirt and combustible materials.

2. Ensure legibility of nameplate, all placards, and other markings.

3. Check security of attachment of the emergency oxygen system to the E-2C Thin Pack Assembly.

4. Check pressure gage (1) to ensure system pressure is 1800 to 2150 psig.

5. Check manual release assembly (2) for security of attachment to cocking toggle (3).

6. Check manual release assembly cable (4) for broken strands of wire, kinks, bends, broken housing, and secure attachment of the manual actuation ball.

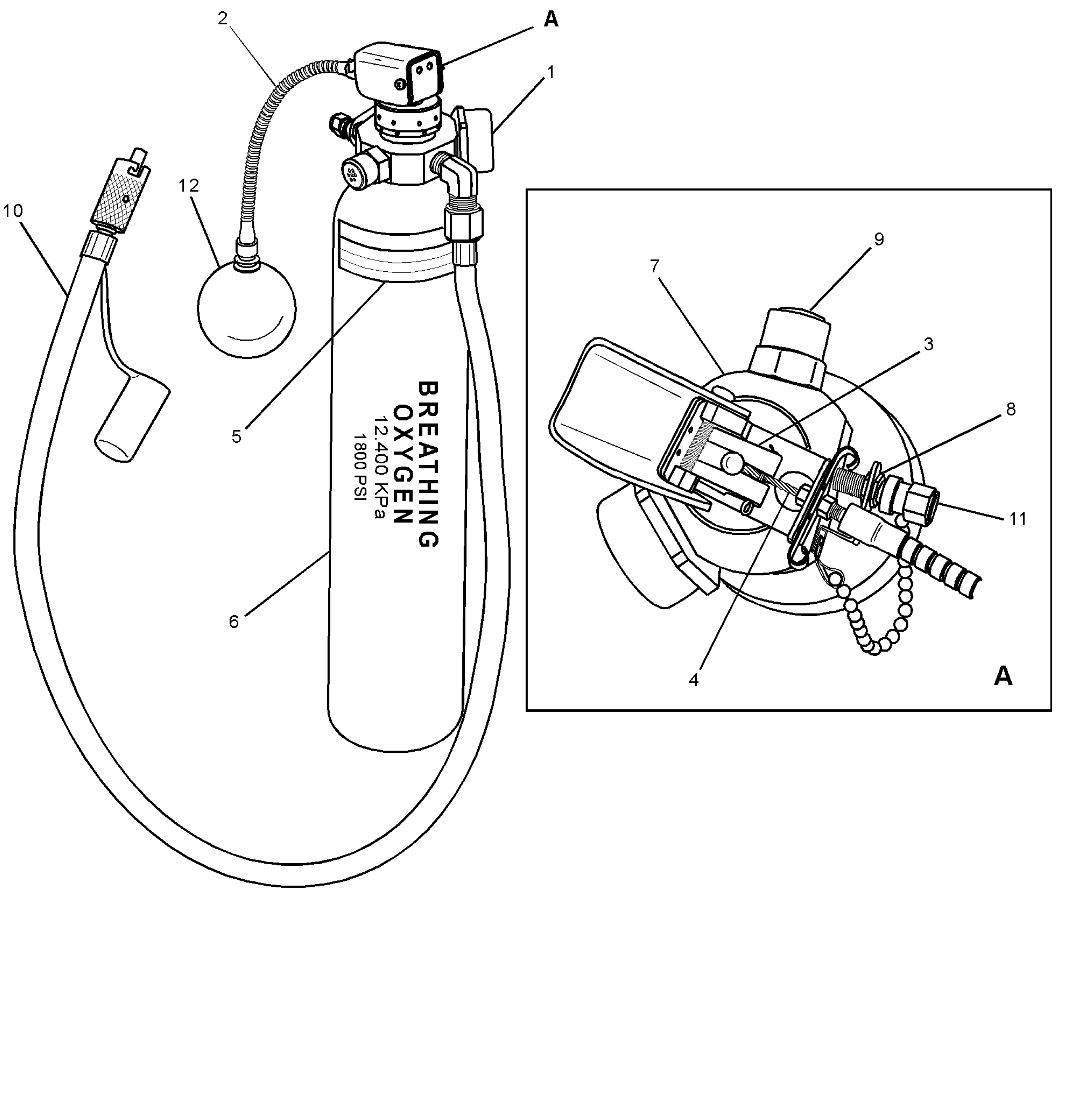


Figure 8A-4. E-2C Emergency Oxygen System Configuration

7. Check for corrosion on and around the oxygen system.

8. Check date of last bench test. No more than 448 days shall have passed since the last bench test.

9. Check oxygen hose for good condition and security of attachment.

8A-26. Components of the aircraft oxygen system which do not pass inspection and cannot be repaired in the aircraft shall be removed and replaced with a ready for issue (RFI) component. Forward defective components to AIMD for bench test.

8A-27. CALENDAR INSPECTION. The Calendar Inspection shall be performed on all E-2C Emergency Oxygen Supplies prior to placing in service, and at intervals not exceeding 448 days thereafter. This interval applies to all E-2C Emergency Oxygen Supplies; aircraft installed, shop spares, and those maintained in servicing pools.

8A-28. The Calendar Inspection consists of a Visual Inspection followed by a Bench Test. All work shall be performed in a clean, dust-free and oil-free area. E-2C Emergency Oxygen Supplies found to be damaged or out of adjustment shall be repaired by replacing or adjusting the discrepant part or parts. After repair, repeat the Bench Test.

8A-29. Visual Inspection. Perform a Visual Inspection of the E-2C Emergency Oxygen Supply in accordance with table 8A-2 and record the results on the Performance Test Sheet (figure 8A-3).

8A-30. E-2C Emergency Oxygen Supplies failing the Visual Inspection or Bench Test (paragraph 8A-31) shall be repaired, if specific repair is authorized. SM&R codes define repairable components and levels of maintenance authorized to perform repairs. Further explanation is found in Naval aviation maintenance program manual, OPNAVINST 4790.2 Series.

8A-31. BENCH TEST.

WARNING

When working with oxygen, make certain that clothing, tube fittings and equipment are free of oil, dirt, grease, fuel, hydraulic fluid, or any combustible material. Fire or explosion may result when even slight traces of combustible material come in contact with oxygen under pressure.

Prior to use, inspect leak detection compound. Compound which is not clear and free from suspended material/sediment is considered contaminated and shall be disposed of. Compound exhibiting peculiar odors such as acetone or alcohol is considered contaminated and shall be disposed of.

NOTE

Some liquid oxygen converter test stands that bear part numbers other than those mentioned in paragraph 8A-32 or covered in appropriate ground support equipment manual still exist. Use of these test stands is authorized provided they are capable of monitoring the E-2C Emergency Oxygen Supply performance as specified in the Bench Test.

8A-32. The Bench Tests shall be performed using liquid oxygen converter test stand P/Ns 59A120, 31TB1995-1, 31TB1995-4, or 1455AS100-1. Do not attempt to perform any bench test without first becoming thoroughly familiar with the test stand and its operation. Refer to NAVAIR 17-15BC-23 for the details of test stand operations and service. The operator shall also be thoroughly familiar with the test to be performed, the anticipated results of the test, and how to record the results on the Performance Test Sheet. The Performance Test Sheet (figure 8A-3) shall be used to record test data when performing all bench tests.

Table 8A-2. Visual Inspection of the E-2C Emergency Oxygen Supply

Part Nomenclature	Index Number	Inspect for	Remedy
Note: Index numbers in this table refer to figure 8A-4.			
Identification label.	5	Legibility, condition, and security.	Secure in place, or replace.
Cylinder.	6	Corrosion, proper marking, proof test markings.	Replace or apply as required. Replace cylinder.
Actuation cable and cable housing.	2	Corrosion, broken cable strands, damage, bent or cracked housing, security of attachment, or other obvious damage.	Replace, clean, or tighten as necessary.
Pressure reducer housing.	7	Corrosion, stripped threads, cracks, dents, other obvious damage.	Repair or replace as necessary.
Pressure gage assembly.	1	Security of attachment legibility, other obvious damage.	Tighten or replace as necessary.
Oxygen filler valve.	8	Stripped threads, dirt, or other obvious damage.	Replace.
Relief valve assembly.	9	Dirt, corrosion, security of attachment.	Tighten or replace as necessary.
Oxygen Hose.	10	Cuts, fraying, breaks, and good condition.	Replace.

NOTE

Tests are arranged so they proceed from one test to the next with a minimum of flow changes. Troubleshooting tables are provided following each test.

8A-33. CHARGING THE E-2C EMERGENCY OXYGEN SUPPLY. Charging (filling) the Emergency Oxygen Supply with aviator's breathing oxygen is a critical operation requiring close attention to procedures. To charge the system, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Aviator's Breathing Oxygen, Type 1	MIL-O-27210

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter, Filler	T186C100-1 (CAGE 30941)
1	Regulator, Pressure	283028-0001 (CAGE 99657) NIIN 01-101-8827 or equivalent

1. Open, then close, oxygen supply cylinder to purge oxygen cylinder.

NOTE

If the E-2C Emergency Oxygen Supply is contaminated or the supply cylinders have been empty for more than two hours, purge the system in accordance with paragraph 8A-38.

Index numbers in parentheses refer to figure 8A-4 unless otherwise noted.

2. Connect pressure regulator to oxygen supply cylinder (6).

3. Connect filler adapter to pressure regulator.

4. Remove filler cap (11) from filler valve (8) of E-2C Emergency Oxygen System.

5. Connect filler adapter to filler valve (8).

6. Ensure pressure reducer has been reset (toggle (3) in up (off) position).

7. Open oxygen supply cylinder.

NOTE

Refer to table 8A-3 for filling stages and table 8A-4 for ambient air temperature vs charging pressures.

WARNING

Observe filling stages, as rapid application of oxygen pressure creates heat which may result in fire or explosion.

Allow no less than three minutes for each filling stage and two minutes between each stage for cooling.

Table 8A-3. Charging Stages

STAGE	PSIG
1	0-500
2	500-1000
3	1000-1500
4	1500-1800
5	1800-2000

Table 8A-4. Ambient Air Temperature Vs Charging Pressures

AMBIENT AIR TEMPERATURE		CHARGING PRESSURE
°F	°C	PSIG
0	-18	1550-1750
10	-12	1600-1775
20	-7	1625-1800
30	-1	1675-1850
40	5	1700-1875
50	10	1725-1925
60	16	1775-1975
70	21	1800-2000
80	27	1825-2050
90	32	1875-2075
100	38	1900-2125
110	43	1925-2150
120	49	1975-2200
130	54	2000-2225

8. Using pressure regulator, charge the E-2C Emergency Oxygen Supply to 1800 psig with aviator's breathing oxygen in strict compliance with tables 8A-3 and 8A-4.

9. Close oxygen supply cylinder.

10. Turn pressure regulator to vent position.

WARNING

Visually check to ensure that filler valve (8) does not turn (loosen) as filler adapter is removed. Serious injury could result.

11. Loosen filler adapter until all pressure is bled from high pressure line. Remove filler adapter from filler valve (8).

12. Proceed to External Leakage Test.

8A-34. EXTERNAL LEAKAGE TEST. To perform the External Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Leak Detection, Type I	MIL-L-25567

Support Equipment Required

Quantity	Description	Reference Number
1	LOX Converter Test Stand	P/N 59A120 or 31TB1995-1 or 31TB1995-4 or 1455AS100-1

WARNING

If any leakage is encountered, the E-2C Emergency Oxygen Supply must be depleted of all pressure prior to attempting any repairs.

Prior to use, inspect leak detection compound. Compound which is not clear and free of suspended material/sediment is considered contaminated and shall be disposed of. Additionally, if the compound has any peculiar odors such as acetone or alcohol it is considered contaminated and shall be disposed of.

Apply leak detector compound sparingly to avoid penetration and contamination of oxygen system.

1. Apply leak detection compound to the oxygen filler valve (8, figure 8A-4), pressure gage assembly (1, figure 8A-4), pressure reducer assembly outlet port, all inlet attach points, and all external screws and plugs.

NOTE

No leakage is acceptable. Leaks are indicated by the formation of bubbles in the leak detection compound.

2. Upon completion of the test, remove all trace of the leak detection compound using a damp, clean, lint-free cloth.

3. Record results of the test on the performance test sheet (figure 8A-3).

WARNING

If any leakage is detected, the E-2C Emergency Oxygen Supply shall be depleted of all pressure prior to attempting any repair action. To deplete system of pressure, pull manual oxygen release assembly.

4. If any leakage is detected, refer to table 8A-5, Troubleshooting (External Leak).

8A-35. ACTUATOR PULL TEST. The following procedures incorporate the use of a liquid oxygen converter test stand and a locally manufactured actuator pull-test lanyard (figure 8A-5). To perform the Actuator Pull Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Leak Detection, Type I	MIL-L-25567

Support Equipment Required

Quantity	Description	Reference Number
1	LOX Converter Test Stand	P/N 59A120 or 31TB1995-1 or 31TB1995-4 or 1455AS100-1
1	50 Pound Push/ Pull Scale	P/N DPP-50 (CAGE 81755) NIIN 00-802-8846
1	Actuator Pull Test Lanyard	Fabricate IAW figure 8A-5

1. Ensure all test stand valves are properly secured. Using test stand hose, connect pressure reducer assembly outlet port to test stand SUPPLY TO CONVERTER supply connection (NIP-6).

2. Open TEST PRESSURE GAGE BUILD-UP AND FLOW valve (V-10).

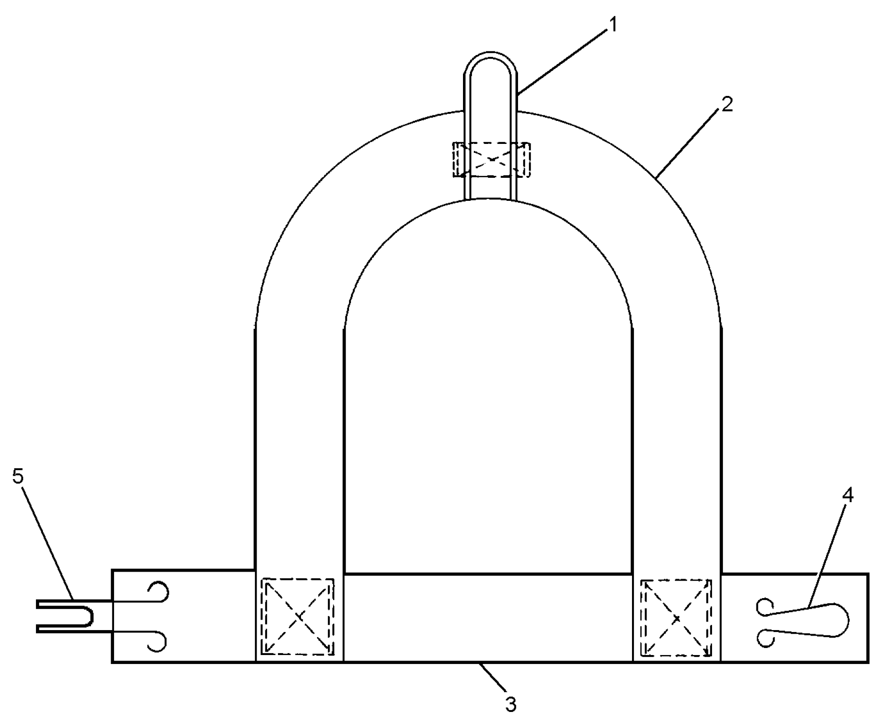
3. Connect test stand hose assembly (P/N 59A120B5-12) to CONVERTER SUPPLY OUTLET connection (NIP-5) and 0 to 150 lpm FLOWMETER connection (NIP-4).

4. Attach locally manufactured actuator pull test lanyard (figure 8A-5) to green actuator ball and attach 50 pound push/pull scale to actuator pull test lanyard. Applying a steady, straight pull, measure and record force required to actuate the pressure reducer assembly (force required shall be 10 to 30 pounds).

NOTE

At this point, 0 to 160 psig TEST PRESSURE gage (PG-1) shall indicate 45 to 80 psig.

5. If force required to actuate pressure reducer assembly is not within tolerance (10 to 30 pounds), adjust cable of manual release assembly (figure 8A-6) by loosening nut (2), adjusting nut (3), and retightening nut (2).



1. TWO-INCH LOOP, TYPE I, NYLON CORD, NIIN 00-240-2154
2. NINE INCHES, TYPE III, 1/2 INCH NYLON TAPE, MIL-T-5038C
3. FOUR INCHES, TYPE III, 1/2 INCH NYLON TAPE, MIL-T-5038C
4. LOCK SPRING TURN, P/N 212257-1 (CAGE 80020), NIIN 00-992-5577
5. HOOK, P/N 212257-2 (CAGE 80020), NIIN 00-095-0067

08a005

Figure 8A-5. Actuator Pull Test Lanyard

Table 8A-5. Troubleshooting (External Leakage)

Trouble	Probable Cause	Remedy
Note: Index numbers in this table refer to figure 8A-9		
Filler valve (7) leaks.	Leakage around thread.	Tighten filler valve as necessary.
	Leakage around filler valve core.	Tighten or replace filler valve core.
Pressure gage (15) leaks.	Loose gage, damaged threads, or damage bordon tube.	Tighten or replace gage.
Oxygen cylinder (1) leaks.	Loose cylinder, stripped threads or damage O-ring.	Tighten or replace fittings, O-rings or cylinders as necessary.
90 degree elbow (11) leaks.	Loose fitting, or stripped threads.	Tighten or replace elbow (11) as necessary.

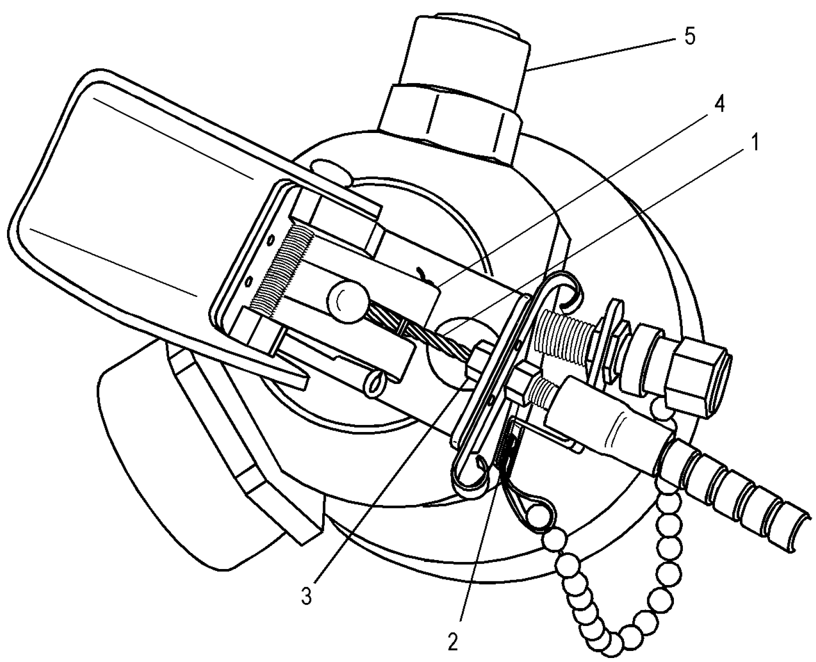


Figure 8A-6. Manual Release Assembly

NOTE

Leave all connections and valves unchanged and proceed to Pressure Reducer Flow/Leakage Test.

8A-36. PRESSURE REDUCER FLOW TEST. To perform the Pressure Reducer Flow Test, the E-2C Emergency Oxygen Supply must be fully charged to 1800 psig. Proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	LOX Converter Test Stand	P/N 59A120 or 31TB1995-1 or 31TB1995-4 or 1455AS100-1

1. Turn FLOW SELECTOR valve (V-1) on the test stand to the 0 to 150 lpm position FLOWMETER connection (NIP-4).

2. With a 0 lpm flow, record TEST PRESSURE gage (PG-1) reading on Performance Test Sheet (reading must be between 45 and 80 psig).

3. Slowly open test stand CONVERTER SUPPLY FLOW CONTROL valve (V-9) until 100 lpm is indicated on the FLOWMETER INDICATOR gage (PG-2). Immediately record TEST PRESSURE gage (PG-1) reading on Performance Test Sheet (reading shall be between 45 and 80 psig).

4. Close CONVERTER SUPPLY FLOW CONTROL valve (V-9).

5. Open CONVERTER SUPPLY FLOW CONTROL valve (V-9) and observe pressure gage (15, figure 8A-9) on pressure reducer assembly. When the indicator needle on the pressure gage bisects the F and I in the word, REFILL, on the dial, close the CONVERTER SUPPLY FLOW CONTROL valve (V-9).

6. Record the reading from the TEST PRESSURE gage (PG-1) on the Performance Test Sheet (reading shall be 45 to 80 psig).

7. Open CONVERTER SUPPLY FLOW CONTROL VALVE (V-9) to indicate 100 lpm on FLOWMETER INDICATOR gage (PG-2).

8. Record reading from TEST PRESSURE gage (PG-1) on Performance Test Sheet (reading shall be 45 to 80 psig).

9. Deplete all oxygen pressure from E-2C emergency oxygen system using CONVERTER SUPPLY FLOW CONTROL valve (V-9).

10. Close CONVERTER SUPPLY FLOW CONTROL valve (V-9).

11. Reset E-2C emergency oxygen system and disconnect from SUPPLY TO CONVERTER connection (NIP-6).

12. Close TEST PRESSURE GAGE BUILD-UP AND FLOW valve (V-10).

13. Disconnect hose (P/N 59A120-B5-12) from 0 to 150 lpm connection FLOWMETER (NIP-4) and CONVERTER SUPPLY OUTLET (NIP-5).

14. If readings are not within tolerance, refer to table 8A-6, Troubleshooting (Flow Test).

15. Proceed to Relief Valve Test.

Table 8A-6. Troubleshooting (Flow Test)

Trouble	Probable Cause	Remedy
Pressure steadily increases on PG-1 with 0 flow.	Poppet assembly leaks.	Replace pressure reducer assembly.
Pressure drops below 45 psig with 100 lpm.	Pressure reducer set too low.	Readjust pressure reducer (paragraph 8A-47).
Pressure does not indicate 45 to 80 psig with 0 flow.	Pressure reducer out of adjustment.	Readjust pressure reducer (paragraph 8A-47).

8A-37. RELIEF VALVE TEST. To perform Relief Valve (5, figure 8A-6) Test using LOX converter test stand, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	LOX Converter Test Stand	P/N 59A120 or 31TB1995-1 or 31TB1995-4 or 1455AS100-1
18 inches	Tubing, Non-metallic, 5/8-inch Inside Diameter	9561-D47 (available Thomas Scientific, 99 High Hill Rd, P.O. Box 99, Swedesboro, N.J. 08085-0099) or equivalent

1. Reset E-2C Emergency Oxygen Supply pressure reducer assembly toggle (4, figure 8A-6) in up (off) position.

2. Using test stand hose, connect outlet of reducer assembly to test stand BELL JAR BOTTOM COUPLING (C-1).

3. Attach non-metallic tubing over relief valve assembly (5, figure 8A-6).

4. Attach other end of non-metallic tubing to test stand 0 to 150 lpm FLOWMETER connection (NIP-4).

5. Ensure test stand DIFFERENTIAL PRESSURE SHUT-OFF valve (V-8) is closed.

6. Open TEST PRESSURE GAGE-TO-BELL JAR valve (V-2).

7. Turn test stand FLOWMETER SELECTOR valve (V-1) to 0 to 150 lpm FLOWMETER Connection position (NIP-4).

CAUTION

Increase pressure slowly. Any rapid surge in pressure could damage test stand FLOWMETER INDICATOR gage (PG-2).

8. Slowly open test stand OXYGEN SUPPLY valve (V-6) while observing FLOWMETER INDICATOR gage (PG-2) for any erratic movement.

9. Observe open pressure of relief valve as indicated on TEST PRESSURE gage (PG-1) and record reading on Performance Test Sheet. Pressure reading shall be 120 to 140 psig.

10. Slowly increase pressure by opening the OXYGEN SUPPLY valve (V-6) until a 100 lpm flow is indicated on the FLOWMETER INDICATOR gage (PG-2).

11. Observe reading on the TEST PRESSURE gage (PG-1) and record on the Performance Test Sheet. Reading shall not exceed 140 psig.

12. Close test stand OXYGEN SUPPLY valve (V-6).

13. Open SYSTEM BLEED valve (V-5) until 110 psig is indicated on the TEST PRESSURE gage (PG-1).

14. Disconnect non-metallic tubing from 0 to 150 lpm FLOWMETER connection (NIP-4).

15. Turn FLOWMETER SELECTOR valve (V-1) to 0 to 0.25 lpm FLOWMETER connection (NIP-1).

CAUTION

Attach non-metallic tubing to FLOWMETER connection (NIP-1) slowly. Excessive relief valve leakage could damage FLOWMETER INDICATOR gage (PG-2).

16. Slowly attach non-metallic tubing (P/N 9561-D47 or equivalent) to 0 to 0.25 lpm FLOWMETER connection (NIP-1) while observing FLOWMETER INDICATOR gage (PG-2) for erratic movement.

17. Observe relief valve leakage reading on FLOWMETER INDICATOR gage (PG-2) and record on Performance Test Sheet. Leakage shall not exceed .01 lpm.

18. Disconnect non-metallic tubing from 0 to 0.25 lpm FLOWMETER connection (NIP-1).

19. Open SYSTEM BLEED valve (V-5) and bleed pressure from test stand.

20. Disconnect pressure reducer assembly outlet from BELL JAR BOTTOM COUPLING (C-1).

21. Remove non-metallic tubing from relief valve (5, figure 8A-6).

22. Secure all test valves.

23. If relief valve test readings are not within tolerance, refer to table 8A-7, Troubleshooting (Relief Valve Test).

24. Proceed to E-2C Emergency Oxygen Supply purge.

8A-38. EMERGENCY OXYGEN SUPPLY PURGE. To purge the E-2C Emergency Oxygen Supply, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter, Filler	T186C100-1 (CAGE 30941)
1	A/M26M-3 Purging Unit	P/N 3447AS100-1

WARNING

Use only oil-free nitrogen, Type 1, Class 1, Grade B for purging LOX converters.

Purging unit model A/M26M-3 has two specially designed 3500 psig nitrogen cylinders. Do not substitute these cylinders with other nitrogen cylinders such as NAN cart cylinders.

While operating purging unit A/M26M-3, protective gloves must be worn by operator. Discharge fittings and hoses can reach temperatures that will cause burns if grasped with bare hands.

NOTE

Personnel operating purging unit model A/M26M-3 should be thoroughly familiar with all valves and controls. Prior to operating refer to appropriate support equipment manual. Personnel operating purging unit model A/M26M-3 shall be licensed in accordance with OPNAVINST 4790.2 Series.

Table 8A-7. Troubleshooting (Relief Valve Test)

Trouble	Probable Cause	Remedy
Excessive leakage.	Relief valve out of adjustment or damaged.	If adjustable, adjust relief valve or replace.
Relief valve vent before 120 psig.	Relief valve out of adjustment.	If adjustable, turn spring retainer clockwise or replace.
Relief valve vent after 140 psig.	Relief valve out of adjustment.	If adjustable, turn spring retainer counterclockwise or replace.
Relief valve fails to vent 100 lpm at 140 psig.	Relief valve out of adjustment.	If adjustable, adjust relief valve to open closer to lower open pressure or replace.

NOTE

Index numbers in parentheses for the E-2C Emergency Oxygen Supply refer to figure 8A-4.

Index numbers in parentheses for purging unit model A/M26M-3 refer to figure 8A-7.

The E-2C Emergency Oxygen Supply shall be purged during each calendar inspection, when contamination is suspected, or when the system has been empty for more than two hours.

1. Pull manual oxygen release assembly (12) to ensure emergency oxygen system is depleted of all oxygen.

2. Remove two supply lines (14) from purge unit cabinet. Connect one end of each supply line (14) to nitrogen supply cylinders and the other end to the supply inlet connection (22) of purge unit.

3. Remove insulated hose (15) from purge unit cabinet. Connect quick disconnect (18) of insulated hose (15) to system (A) quick disconnect (19) of purge unit.

4. Connect filler adapter to B-nut (23) of insulated hose (15).

5. Turn purge unit 3-way valve (20) to system (A) position.

6. Ensure power switch (5) is OFF.

7. Remove power cable (17) from purge unit cabinet and plug into 110 volt outlet.

8. Open both nitrogen supply cylinder valves.

9. Open hand shutoff valve (1) and (3). High pressure gage (4) will indicate nitrogen supply cylinder pressure.

10. Connect filler adapter and insulated hose (15) to filler valve (8) of E-2C emergency oxygen supply.

11. Turn power switch (5) to ON position. Power on light (6) should illuminate.

12. Turn pressure regulator (11) clockwise until 120 psig is indicated on low pressure gage (2).

13. Observe heater on light (7). When light cycles from on to off the purging unit is ready for use.

14. Reset pressure reducer assembly toggle (3) and allow E-2C Emergency Oxygen Supply cylinders (6) to fill to 120 psig.

15. Pull E-2C Emergency Oxygen Supply manual release (12) to deplete system of pressure.

16. Reset pressure reducer assembly toggle (3).

17. Repeat steps 14, 15, and 16 two more times.

18. Pull E-2C Emergency Oxygen Supply manual release (12) and allow heated nitrogen to free flow for 10 minutes.

19. When purging is complete, turn purge unit power switch (5) to OFF.

20. Close nitrogen supply cylinder valves.

21. Observe low pressure gage (2) and high pressure gage (4) until they indicate 0 psig. Back out counterclockwise on pressure regulator (11).

22. Close hand shutoff valves (1) and (2).

23. Disconnect filler adapter and insulated hose (15) from filler valve (8) of E-2C emergency oxygen.

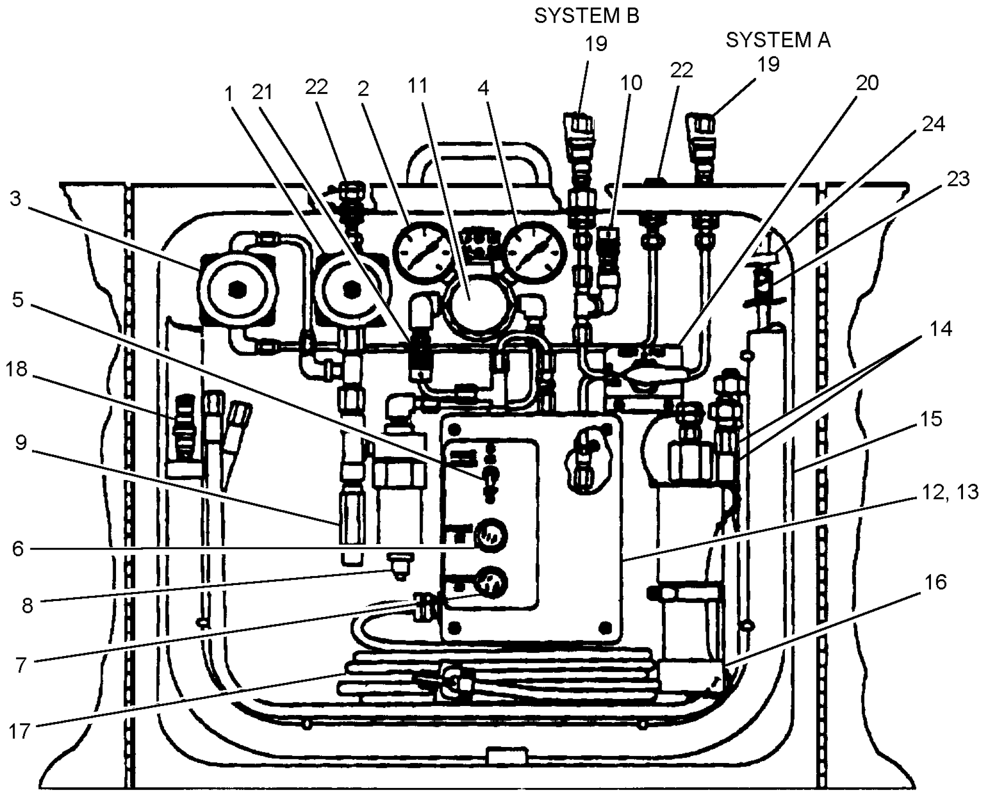
24. Disconnect insulated hose (15) from purging unit system (A) quick disconnect (19).

25. Stow all lines and accessories and secure from purging.

26. Ensure all purge gas (nitrogen) has been depleted from the Emergency Oxygen Supply.

27. Reset pressure reducer assembly toggle (3).

28. Immediately charge the Emergency Oxygen Supply with aviator's breathing oxygen in accordance with paragraph 8A-33.



Description	Function
1. Hand Shutoff Valve	Controls Supply Gas Flow
2. Low Pressure Gage	Indicates Delivery Gas Pressure (0-200 PSIG)
3. Hand Shutoff Valve	Controls Supply Gas Flow
4. High Pressure Gage	Indicates Supply Gas Pressure (0-4000 PSIG)
5. Power Switch	Master On/Off Switch/Circuit Breaker
6. Power On Light	Indicates Master Switch is On and Set is Operational
7. Heater On Light	Indicates Operation of Heater
8. Priority Valve	Stops Gas Flow When Supply Gas Pressure Falls Below 200 PSIG
9. Relief Valve	Relieves Supply Pressure Exceeding 3750 PSIG
10. Low Pressure Relief Valve	Relieves Service Line Supply Pressure Exceeding 705 PSIG
11. Pressure Regulator Assembly	Regulates Pressure to 0-200 PSIG
12. Temperature Control Switch (Under Plate)	Cycles Off and On to Control Exit Gas
13. High Temperature Shutdown (Under Plate)	Shuts Off Heater when Heater Block Temperature Reaches 285°F
14. Supply Line	Connects Supply Cylinders to Housing Assembly
15. Insulated Hose Assembly	Connects Housing Assembly
16. Filler Valve	Connects Insulated Hose Assembly to Converter
17. Power Cable	Connects Unit to Electrical Power
18. Quick Disconnect	Connects Insulated Hose to 19 System A or B
19. Quick Disconnect	Connection for Insulated Hose to 19 System A or B
20. 3-Way Valve	Selects A or B Outlet Ports
21. High Pressure Relief Valve	Relieves Service Line Supply Pressure Exceeding 1355 PSIG
22. Supply Pressure Inlet	Connects Supply Line 14 to Purge Unit
23. B-Nut	Connects Insulated Hose to Filler Valve 16 or Adapter (Not Shown)
24. Adapter	Connects Insulated Hose to P-3 Aircraft Filler Port

08a007

Figure 8A-7. A/M26M-3 Purging Unit

8A-39. DISASSEMBLY.

8A-40. Disassemble the E-2C Emergency Oxygen System only to the extent necessary to perform required authorized maintenance. Disassemble the system as follows:

WARNING

Do not attempt any disassembly until the E-2C Emergency Oxygen Supply has been depleted of all oxygen pressure.

NOTE

Disassembly of the E-2C Emergency Oxygen Supply is limited to removal of the following parts: filler valve, filter, filler valve cap, relief valve, elbow, hose, and pressure gage assembly.

Index numbers refer to figure 8A-9 unless otherwise noted.

1. Using a wrench, remove pressure gage (15) from pressure reducer (2) by turning wrench in counterclockwise motion.

2. Remove hose assembly (14) from elbow (13).

3. Remove elbow (13) from pressure reducer (2).

4. Remove relief valve assembly (11) from pressure reducer (2).

5. Unscrew cap (5) from filler valve (7).

6. Remove filler valve shield (6) and cap and chain assembly (5) from pressure reducer (2) by removing screw (4).

7. Remove filler valve (7) and filter (9) from pressure reducer (2).

8A-41. CLEANING.

8A-42. To clean the E-2C Emergency Oxygen Assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
1	Brush, Soft Bristle	—
As Required	Cloth, Lint-free, Type II	MIL-C-85043
1	Wash Bottle	MS36070A
As Required	Bag, Plastic	MIL-B-117
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411

WARNING

Do not use oil, or any material containing oil, in conjunction with oxygen. Oil, even in minute quantity, coming in contact with oxygen can cause explosion or fire. Dust, lint, and fine metal particles are also dangerous contaminants.

1. Clean all metallic parts in accordance with procedures outlined in Chapter 4 of this manual. Blow dry using oil-free nitrogen.

2. Cleaned parts shall be sealed in plastic bags for storage. Bag all complete assemblies that are not immediately returned to service.

8A-43. INSPECTION OF DISASSEMBLED PARTS.

8A-44. Inspect disassembled component parts in accordance with table 8A-8.

Table 8A-8. Inspection of Disassembled Components

Note: Index numbers in this table refer to figure 8A-9.		
REPLACE ALL PARTS THAT DO NOT PASS INSPECTION		
Nomenclature	Figure and Index Number	Inspect For
Cylinder Assembly	-1	Manual Actuator, Cable, and Cable Housing (3), for security of attachment, good condition, and broken cable strands. Swaged Ball for secure attachment. Pressure Reducer (2) for stripped threads and good condition.
Pressure Gage Assembly	-15	Legibility of markings, alignment of gage pointer, and stripped threads.
Low Pressure Hose	-14	Good condition and stripped threads.
Relief Valve Assembly	-11	Good condition and stripped threads.
Elbow	-13	Good condition and stripped threads.
Filler Valve Assembly	-7	Good condition and stripped threads.
Filler Valve Shield	-6	Good condition.
Cap and Chain Assembly	-5	Good condition and stripped threads.
Filter	-9	Good condition and free of contaminates.

8A-45. ASSEMBLY.

8A-46. To assemble the E-2C Emergency Oxygen System, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Tape, Anti-seize	MIL-T-27730

Support Equipment Required

Quantity	Description	Reference Number
1	Torque Wrench 0-150 in-lb	TE-6FUA (CAGE 55729) or equivalent

NOTE

Index numbers refer to figure 8A-9 unless otherwise noted.

1. Apply two turns of anti-seize tape to pipe threads of elbow (13). Screw elbow (13) onto pressure reducer (2) hand tight, then tighten with a wrench an additional two turns.

2. Attach low pressure hose (14) to nipple end of elbow (13).

3. Ensure preformed packing (10) is installed on base of pressure gage (15) threads. Install pressure gage (15) onto pressure reducer (2) and torque to 150 in-lb.

4. Install preformed packing (12) onto relief valve (11). Install relief valve (11) onto pressure reducer (2) and torque to 150 in-lb.

5. Apply two turns of anti-seize tape to pipe threads of filler valve (7). Install filter (9) into pressure reducer. Install filler valve (7) onto pressure reducer (2) hand tight, then tighten with a wrench an additional two turns.

NOTE

When performing step 6, it may be necessary to tighten filler valve (7) slightly to orient hexagon flats of filler valve (7) for proper installation of filler valve shield (6).

6. Position filler valve shield (6) over hexagon flats of filler valve (7) and screw hole of pressure reducer (2). Secure filler valve shield (6) and cap and chain (5) to pressure reducer (2) with screw (4).

8A-47. POST ASSEMBLY ADJUSTMENT AND LEAKAGE TEST OF PRESSURE REDUCER ASSEMBLY.

8A-48. Refer to paragraph 8A-33 to charge Emergency Oxygen Cylinder and paragraphs 8A-31 through 8A-37 for performance of leakage test, relief valve test and pressure reducer test.

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275
As Required	Leak Detection Compound, Type 1	MIL-L-25567
As Required	Tape, Anti-seize	MIL-T-27730
As Required	Krytox 240 AZ	MIL-G-27617 (CAGE 81349) NIIN 01-007-4384

Support Equipment Required

Quantity	Description	Reference Number
2	Wrench, Spanner	2000AS360-1 (CAGE 30003)

8A-49. To perform the Post Assembly Adjustment and Leak Test, proceed as follows:

NOTE

Due to the complexity of each of the test stands, 1172AS100 and 1316AS100, it is essential that the operator become thoroughly familiar with the test stand to be used.

1. Using the vent flow graph supplied with the test stand in use, convert a 100 lpm flow to inches of water.

WARNING

Because of the possibility of vacuum pump explosion, only water-pumped nitrogen, Type I, Class I, Grade B shall be used.

Oxygen test stands and purging equipment shall use nitrogen only from gray cylinders marked NITROGEN OIL-FREE in white letters with two 3-inch wide black bands marking the tops. Do not use 3500 psig nitrogen cylinders. These cylinders cannot be certified contaminant free.

NOTE

Nitrogen supply cylinders used in testing oxygen components contain a maximum of 1800 psig. For tests requiring 1800 psig, use highest available pressure, but in no case shall this pressure be less than 500 psig.

2. Using regulated nitrogen supply source, slowly increase pressure to pressure reducer assembly (2, figure 8A-9) to 1800 psig.

3. Observe test stand nitrogen input pressure gage (27) to ensure that there shall be no leakage indicated. No leakage is allowed.

4. Using leak detection compound, ensure that there is no leakage around pressure gage (15, figure 8A-9), relief valve (8, figure 8A-9) and outlet of pressure reducer.

5. Actuate manual release assembly (12, figure 8A-4). Observe nitrogen input pressure gage (27) on test stand to ensure that pressure indication is 45 to 80 psig. If the nitrogen input pressure gage does not indicate 45 to 85 psig, perform steps a thru d below.

NOTE

When performing steps a thru d, pressure reducer assembly toggle (38) must be in the up (off) position before making adjustment and in the down (on) position to check adjustment.

Index numbers in parentheses for steps a through d refer to figure 8A-8 unless otherwise noted.

a. If indicated pressure is below 45 psig, use spanner wrench P/N 2000AS360-1 (1) to stabilize pressure reducer assembly (2, figure 8A-9), and, using a second spanner wrench P/N 2000AS360-1 (2), turn the lock ring bottom assembly clockwise to loosen it.

b. Remove spanner wrench (2) on lock ring. To increase pressure, turn spanner wrench (1) clockwise until 70 psig is indicated on the test stand nitrogen input pressure gage (27). Upon completion of adjustment, tighten lock ring against upper assembly with spanner wrench (2).

c. If indicated pressure is above 80 psig, use spanner wrench P/N 2000AS360-1 (1) to stabilize pressure reducer assembly (2, figure 8A-9), and, using a second spanner wrench P/N 2000AS360-1 (2), turn the lock ring bottom assembly clockwise to loosen it.

d. Remove spanner wrench on lock ring bottom assembly. To decrease pressure, turn spanner wrench (1) counterclockwise until 70 psig is indicated on the test stand nitrogen input pressure gage (27). Repeat as necessary. Upon completion of adjustment, tighten lock ring against upper assembly with spanner wrench (2).

6. Open vent pressure valve (H) on test stand until 100 lpm flow is indicated on vent flow manometer (3). Nitrogen input pressure gage shall indicate 45 to 80 psig. If the nitrogen input pressure gage does not indicate 45 to 80 psig, perform step 5a or 5d above, as necessary.

7. Vent pressure regulator until regulated nitrogen supply source to pressure reducer assembly (1) is 250 psig.

8. With 100 lpm flow still indicated on test stand vent flow manometer (3), nitrogen input pressure gage (27) shall indicate 45 to 80 psig. If the input pressure gage does not indicate 45 to 80 psig, perform step 5a or 5d, above as necessary.

9. Close test stand vent pressure valve (H). Nitrogen input pressure gage (27) shall indicate 45 to 80 psig. If 45 to 80 psig is not indicated perform steps 5a thru 5d, as necessary.

10. Secure regulated nitrogen supply source to pressure reducer assembly (1). Open system bleed valve(s) and bleed pressure from the test stand.

11. Secure all test stand valves and disconnect pressure reducer assembly (1) from regulated nitrogen supply source and test stand.

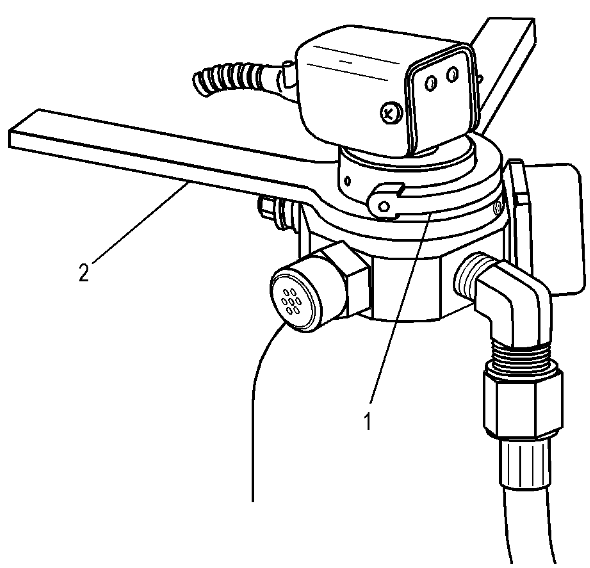


Figure 8A-8. Post Assembly Adjustment of Pressure Reducer Assembly

8A-50. REPAIR.

8A-51. Repair of the E-2C Emergency Oxygen System is limited to the replacement of defective parts.

8A-52. REPLACEMENT OF FILLER VALVE CORE. To replace a filler valve core, proceed as follows:

Materials Required

Quantity	Description	Reference Number
1	Removal Tool, Valve Core	P/N 3522 NIIN 00-308-3809
As Required	Tape, Anti-seize	MIL-T-27730
As Required	Core, Valve	MIL-V-8965
As Required	Compound, Leak Detection, Type I	MIL-L-25567

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, 7/16 inch	—

WARNING

Ensure there is no pressure in cylinder prior to removal of filler valve.

NOTE

Index numbers in parentheses refer to figure 8A-9 unless otherwise noted.

1. With removal tool P/N 3522 and 7/16 inch wrench on filler valve, insert tool and turn counterclockwise to remove valve core (8).

2. Insert new valve core into filler valve and turn clockwise until tight.

8A-53. Filler Valve Leakage Test. To perform filler valve leakage test, proceed as follows:

WARNING

When performing filler valve leakage test, if leakage is present do not attempt repair until oxygen cylinder has been completely depleted of all pressure.

1. To charge bottle refer to paragraph 8A-33.

2. After charging to 1800 psig leak check filler valve using leak detection compound. No leakage is allowed. If leak is detected, drain bottle and repeat steps 1 and 2 of paragraph 8A-52 and follow with steps 1 and 2 of paragraph 8A-53.

Section 8A-5. Illustrated Parts Breakdown

8A-54. GENERAL.

8A-55. This section provides an illustrated parts breakdown of the assemblies and detail parts of the Emergency Oxygen Supply (P/N 269D550-3).

8A-56. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

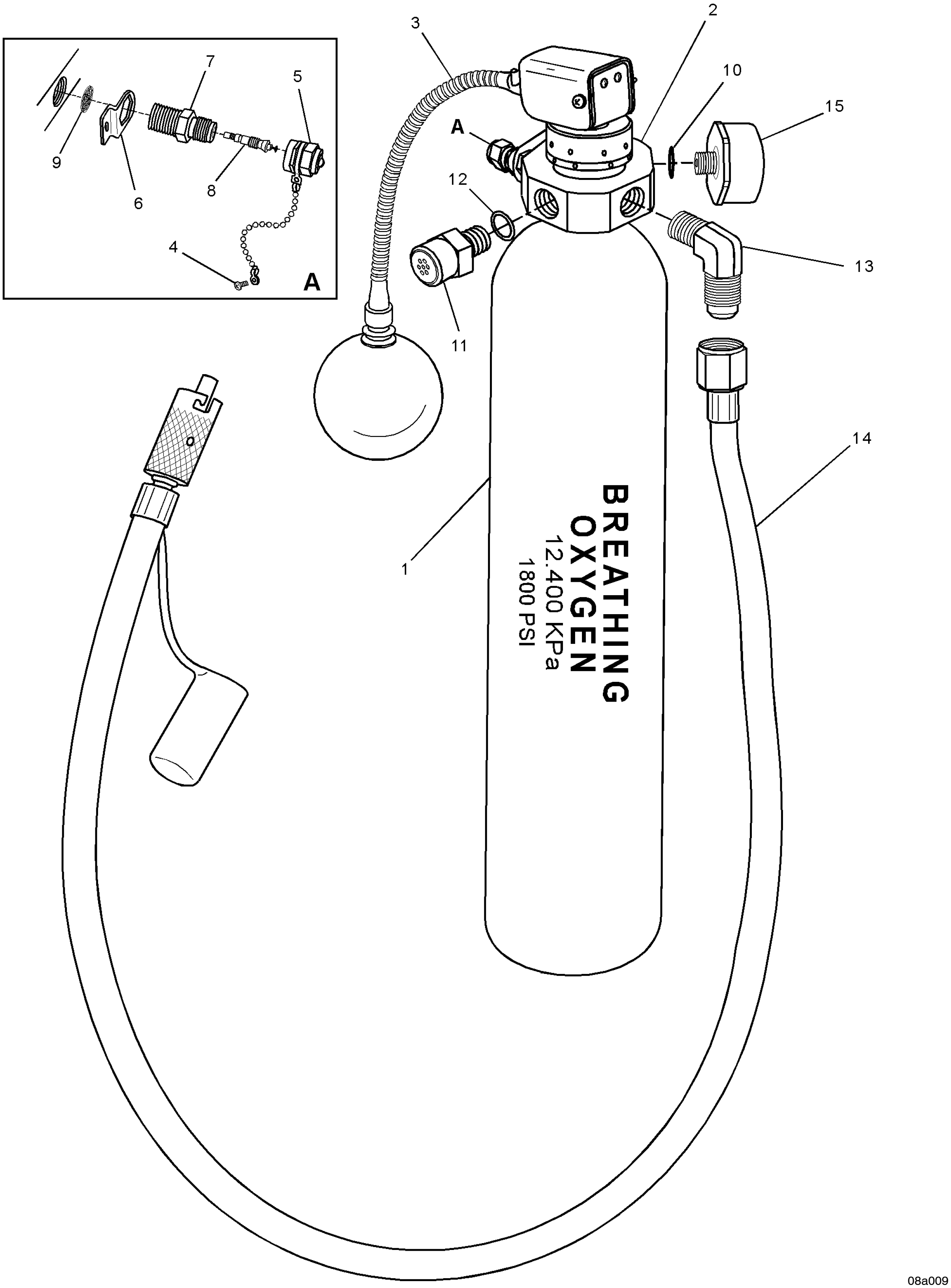


Figure 8A-9. Emergency Oxygen System Installation

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
8A-9	269D550-3	E-2C EMERGENCY OXYGEN SUPPLY	REF	
-1	235D250-1	. OXYGEN, Cylinder (Note 1)	1	
-2	269E850-101	. PRESSURE REDUCER ASSEMBLY (Note 1) . . .	1	
-3	269C855-3	. MANUAL RELEASE ASSEMBLY (Note 1)	1	
-4	MS51957-26	. SCREW	1	
-5	269C860-1	. CAP AND CHAIN ASSEMBLY	1	
-6	226C870-13	. SHIELD ASSEMBLY, Filler Valve	1	
-7	221B380-1	. VALVE ASSEMBLY, Filler	1	
-8	MIL-V-8965	. . VALVE CORE	1	
-9	266B419-11	. FILTER	1	
-10	NAS1602-903	. O-RING	1	
-11	275C200-1	. VALVE ASSEMBLY, Relief	1	
-12	MS9068-012	. O-RING	1	
-13	MS20822-5	. ELBOW	1	
-14	269C921-3	. HOSE ASSEMBLY, Low Pressure	1	
-15	EW68005	. GAGE, Pressure	1	

Notes: 1. No repair action can be performed on these parts, minor adjustments only. If these parts can not be adjusted within tolerance, a complete new E-2C Emergency Oxygen Supply must be ordered.

NUMERICAL INDEX

Part Number	Figure and Index Number	SM&R Code
EW68005	8A-9-15	PAGZZ
MIL-V-8965	8A-9-8	PAGZZ
MS9068-012	8A-9-12	PAGZZ
MS20822-5	8A-9-13	PAGZZ
MS51957-26	8A-9-4	PAGZZ
NAS1602-903	8A-9-10	PAGZZ
221B380-1	8A-9-7	PAGZZ
226C870-13	8A-9-6	PAGZZ
235D250-1	8A-9-1	PAGZZ
266B419-11	8A-9-9	PAGZZ
269C855-3	8A-9-3	PAGZZ
269C860-1	8A-9-5	PAGZZ
269C921-3	8A-9-14	PAGZZ
269D550-3	8A-9	PAGGG
269E850-101	8A-9-2	PAGZZ
275C200-1	8A-9-11	

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CHAPTER 9

PRESSURE REDUCER ASSEMBLIES

P/Ns F103D000-1, F103D000-7, F103D000-11, AND F103D000-15

Section 9-1. Description

9-1. GENERAL.

9-2. The Pressure Reducer Assembly (figure 9-1) P/Ns F103D000-1, F103D000-7, F103D000-11, and F103D000-15, is a bellows type reducer. Table 9-1 contains the leading particulars for the pressure reducer.

9-3. Gaseous oxygen is stored in the aircraft oxygen bottles at a working pressure of 1800 psi. The pressure reducer reduces the 1800 psi bottle pressure to a delivery pressure of 60 to 75 psi to prevent system overpressurization.

9-4. This chapter will cover disassembly, repairing, cleaning, reassembly and testing procedures of the Carleton pressure reducer assemblies.

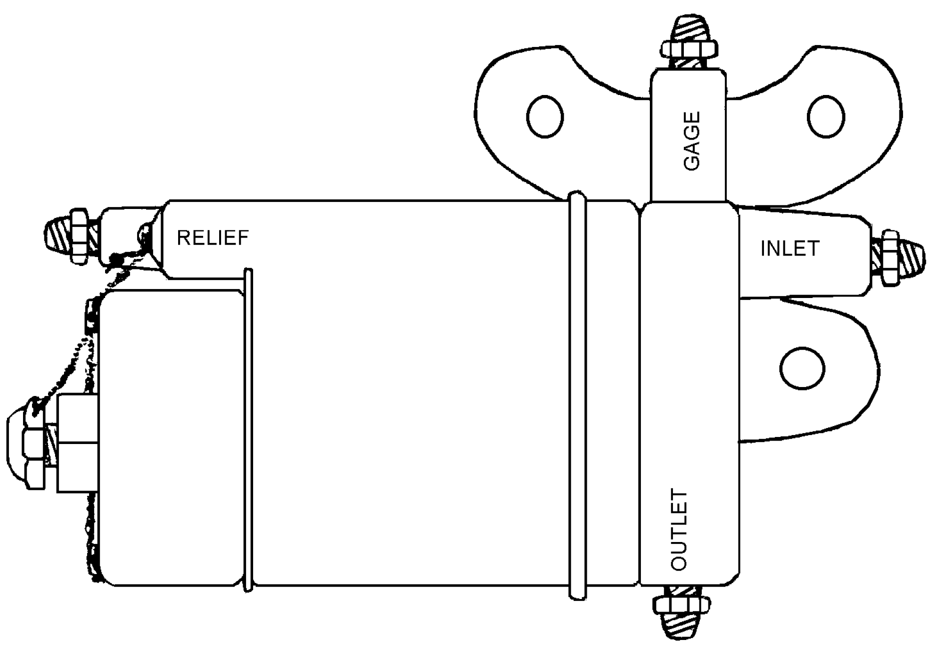

Figure 9-1. Oxygen Pressure Reducer Assembly

Table 9-1. Leading Particulars

CHARACTERISTICS	
Nomenclature	Pressure Reducing Valve
Weight	1.4 lbs.
Height	2 7/8 in.
Length	4 11/16 in.
Width	2 1/32 in.
Operating Gas Type	Oxygen
Port Identification	Gage, Inlet, Relief, Outlet
Relief Valve Characteristics:	
Opening Pressure	145 ± 15 psig
Closing Pressure	115 psig, min.
Reducer Outlet Flow	75 std lpm, min, at 120 psig

Section 9-2. Modifications

9-5. GENERAL.

9-6. There are no modifications to the Pressure Reducer Assemblies P/Ns F103D000-1, F103D000-7, F103D000-11, and F103D000-15 required/authorized at this time.

Section 9-3. Maintenance

9-7. GENERAL.

9-8. This section contains the procedural steps for Disassembly, Cleaning, Inspection, Repair or Replacement, Lubrication, Reassembly and Test Procedures of the Pressure Reducer Assemblies.

9-9. DISASSEMBLY.

NOTE

Disassembly of the Pressure Reducer is only required for visible corrosion, external defects, or the pressure reducer fails the bench test in accordance with paragraph 9-21.

9-10. Disassemble the pressure reducer assemblies as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Acetone	—

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Retainer	OT620
1	Wrench, Spanner	OT561
1	Wrench, Valve Seat	OT405

1. Perform all disassembly and overhaul procedures in a clean, dust free area provided with air conditioning or air filtration. Keep all parts of individual reducer assemblies separated. Required tools are listed on table 9-2.

2. Disassemble reducing valve only to the extent necessary to perform required cleaning, inspection, repair or replacement, or testing procedures. Disassemble unit (either partially or completely) in the sequence indicated by the index numbers of figure 9-2. Unless otherwise indicated, index numbers as given refer to figure 9-2.

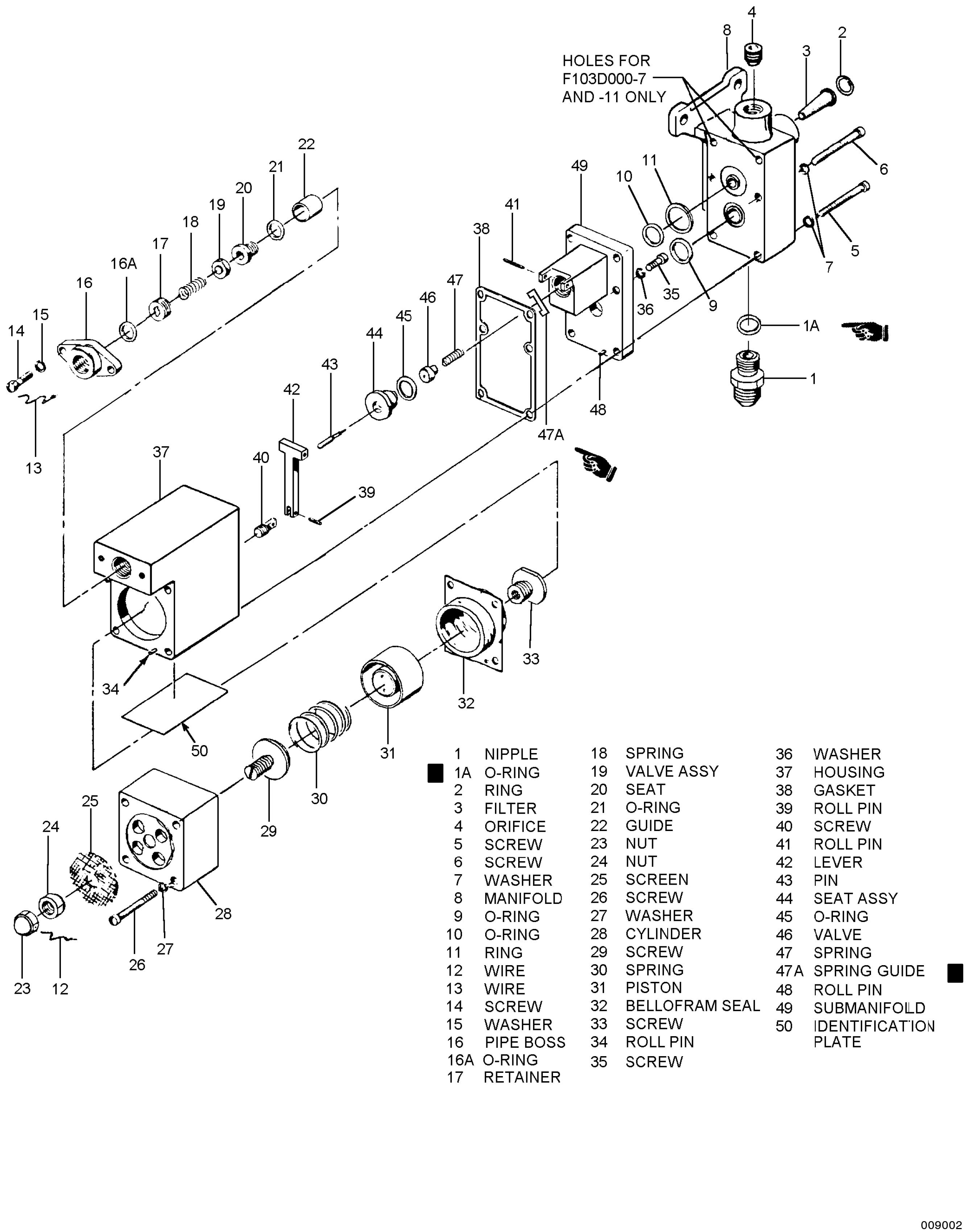

Figure 9-2. Reducing Valve Part Layout

Table 9-2. Special Tools and Test Equipment

Part Number	Manufacturer	Nomenclature	Key to Text
OT405	Carleton Technologies Orchard Park, NY.	Valve Seat Wrench.	9-10, step 7.
OT561	Carleton Technologies Orchard Park, NY.	Spanner Wrench.	9-10, step 6.
OT620	Carleton Technologies Orchard Park, NY.	Retainer Wrench.	9-10, step 4.

3. Discard O-rings (1A, 9, 10, 16A, 21, and 45), safety wires (12 and 13) and gasket (38) at each overhaul.

4. To break seal between retainer (17) and housing (37), apply a few drops of acetone on edge of sealant. Use retainer wrench to remove retainer when sealant becomes pliable. Remove spring (18).

CAUTION

Handle valve assembly (19) and seat (20) carefully to avoid damage to polished surfaces.

5. Use an 1/8-inch allen wrench to remove seat (20).

6. Piston (31), bellofram seal (32) and screw (33) must be removed as a unit and then disassembled. Carefully pry flange of bellofram seal away from housing (37), insert spanner wrench in piston, and rotate wrench counterclockwise to remove parts as a unit. Place a 5/8-inch open end wrench on screw (33) to disassemble unit into individual parts.

CAUTION

Do not remove roll pins (34) or (48) unless replacement is necessary. Continual removal of roll pins cause enlargement of mounting holes in housing (37) and submanifold (49).

7. Use valve seat wrench to remove seat assembly (44) from submanifold (8 or 49).

CAUTION

Be careful not to bend or otherwise damage pin (43), or scratch or mar polished surfaces of seat assembly (44) and valve (46).

8. Do not remove plate (50) unless replacement is necessary.

9-11. CLEANING.

9-12. Clean the Pressure Reducer Assemblies as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Bag, Plastic	MIL-B-117
As Required	Brush, Non-metallic, Soft	A-A-289
As Required	Cloth, Cleaning	MIL-C-85043
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

WARNING

Care is to be taken to avoid prolonged breathing or skin contact with acetone. Approved respirators, gloves, and eye protection shall be used.

1. Remove all traces of sealing compound from screws (5, 6, 14, 26, and 35), washers (7, 15, 27, and 36), retainer (17), housing (37), and submanifold (8 or 49) as applicable.

2. Brush away foreign matter using a soft non-metallic brush.

3. Discard filter (3) if found to be contaminated with foreign particles.

4. Clean metallic parts using procedures outlined in Chapter 4.

5. Wipe non-metallic parts with a clean, lint-free cloth.

6. Dry parts with oil-free nitrogen at 25 psi maximum. Metallic parts may be dried in an industrial oven pre-heated to between 121°C (250°F) and 149°C (300°F) for approximately 30 minutes. Do not exceed specific drying times and temperatures.

7. Store cleaned parts in plastic bags to prevent contamination and loss.

9-13. INSPECTION.

9-14. Inspect the disassembled parts as follows (table 9-3):

NOTE

Instructions are provided for parts; however, kits are to be used unless not readily available from supply.

1. Visually inspect all metallic parts (as applicable) for breaks, scratches, cracks, corrosion, distortion or any other defects. There are no tolerances for wear other than those in table 9-3. Continuous use of detail parts is allowed only as long as inspection and test requirements can be met.

2. Inspect all reducing valve components for hydrocarbon contamination. An explosion may result if oxygen contacts contaminated parts. Use an ultraviolet light (or equivalent means) to perform this inspection. Ultraviolet lights can detect contaminants not normally visible to the naked eye. If contaminants are detected, clean the components using procedures provided in Chapter 4. If unable to clean the components, replace them with new components.

9-15. REPAIR OR REPLACEMENT.

9-16. Repair or replacement shall be as follows:

NOTE

Instructions are provided for parts; however, kits are to be used unless not readily available from supply.

1. Permissible repair is limited to removing minor burrs, nicks, scratches, and corrosion from parts where removal will not affect the performance.

2. Replace all parts that are damaged beyond repair or that fail to meet inspection requirements and cannot be restored to usable condition by allowable repairs.

9-17. LUBRICATION.

9-18. Lubrication is accomplished during reassembly.

WARNING

All hydrocarbon or hydrocarbon-based lubricants shall not be used on reducing valve parts. Such lubricants, even in minute amounts, can cause an explosion or fire if they come in contact with oxygen.

1. Lubrication of the pressure reducer assemblies shall be performed as indicated during reassembly. Only approved lubricants as specified shall be used.

Table 9-3. Inspection Particulars

Part Name and Part No.		Type of Inspection	Inspect For	Acceptable Defects
Filter.	14898	Visual.	Inspect for broken surfaces, particularly at the outside diameter.	None.
Manifold. Cylinder. Housing. Submanifold.	F103D004-1 F103D004-3 16405 17865 17974	Visual.	Inspect for structural defects, excessive scratching, deep dents, pitting, and corrosion.	Slight scratches only on non-sealing surfaces.
Springs.	F3981032 16541 16727	Visual.	Inspect for distortion, unevenly paced or elliptical convolutions, open and rounded coil ends, and corrosion.	None.
Seat.	16681	Visual.	Inspect O-ring seating area for nicks or burrs.	None.
Screen.	16404	Visual.	Inspect for dirt, torn or excessively bent fibers, and enlarged screen holes.	None.
Piston.	17954	Visual.	Inspect surface of outside diameter for unsmooth, pitted, or scratched condition; ascertian that serrations are clean and free of foreign matter.	None.
Lever. Seat Assembly. Valve.	17849 17929 17958-1	Visual.	Inspect highly polished surfaces of these parts for evidence of chipping or scratching and corrosion.	None.
Seat Assembly.	17929	Measurement.	Measure inside diameter. Diameter shall not exceed 0.0634 inch.	None.
Guide (F103D000-7 and -11 only).	16682	Visual.	Inspect surfaces for pitted or scratched condition; make certain part is clean and free of foreign matter and corrosion.	None.

9-19. REASSEMBLY.

9-20. Reassembly of the pressure reducer assemblies is as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Tape, Anti-seize	MIL-T-27730
As Required	Krytox 240 Lubricant, Type II	MIL-G-27617
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Spanner	OT561
1	Wrench, Valve Seat	OT405

1. Reassemble reducing valve in reverse of the sequence indicated by the index numbers of figure 9-2, noting the precautions used in paragraph 9-8.

2. Apply a thin coat of Krytox 240 to O-rings (1A, 9, 10, 16A, 21, and 45), gasket (38) and bottom of screw (29) prior to assembly.

CAUTION

Do not over-tighten screws, as damage to the heads or threads may result. Also, roll pins (48, 41, 39, and 34) should be re-installed carefully, as improper alignment and malfunction of components may result if pins are bent or nicked.

3. Re-install components (43 thru 47A) into submanifold (8 or 49) in the following sequence: Place spring guide (47A, F103D000-15 only), spring (47), valve (46) and pin (43) into submanifold. Place O-ring (45) onto seat (44) and carefully guide seat (44) onto pin (43). Using valve seat wrench, carefully tighten seat (44) into submanifold (8 or 49).

4. Align bellofram seal (32) with piston (31) as shown in figure 9-3. Moisten seal with Krytox 240 or equivalent. Holding piston (31) with spanner wrench, thread screw (33) into piston. Using care not to damage bellofram seal (32), tighten screw to approximately 5 in-lb. torque with a 5/8-inch open end wrench.

5. Invert bellofram seal (32) over piston (31) as shown in figure 9-3. Set piston and seal assembly aside.

6. Insert gasket (38) onto submanifold (8 or 49). Insert lever assembly (42) through housing (37) until lever assembly protrudes through housing as shown in figure 9-4.

7. Screw piston and seal assembly (31 and 32) onto lever (42) protruding through housing (37) as shown in figure 9-4. Tighten assembly finger tight, then back assembly off counterclockwise approximately one full turn.

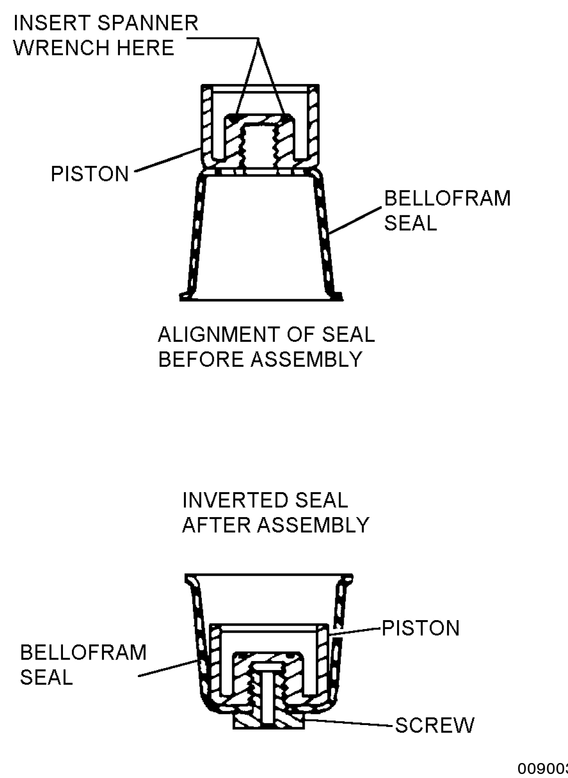

Figure 9-3. Bellofram Seal Installation

8. Align bellofram seal (32) in housing (37) using guidepins, ensuring holes in bellofram seal are mated to rollpins (34) in housing (37) (figure 9-6).

9. Install screw (29) into cylinder (28) fully counterclockwise until screw (29) bottoms out, then turn screw (29) clockwise approximately one full turn. Do not install screen (25), nut (24), and nut (23).

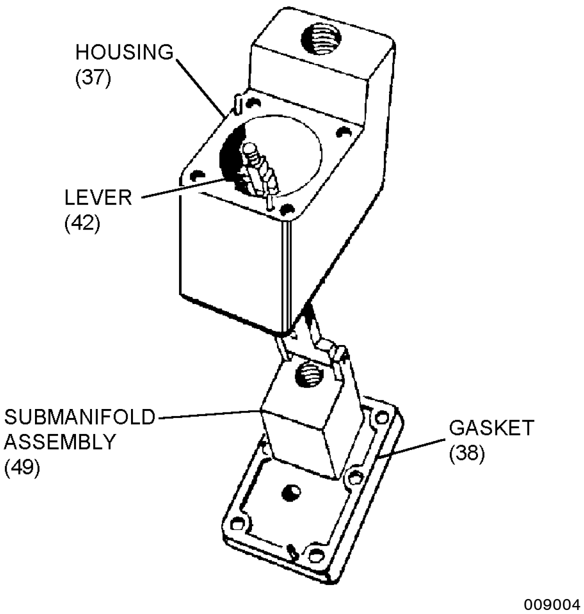

Figure 9-4. Housing and Submanifold Assembly

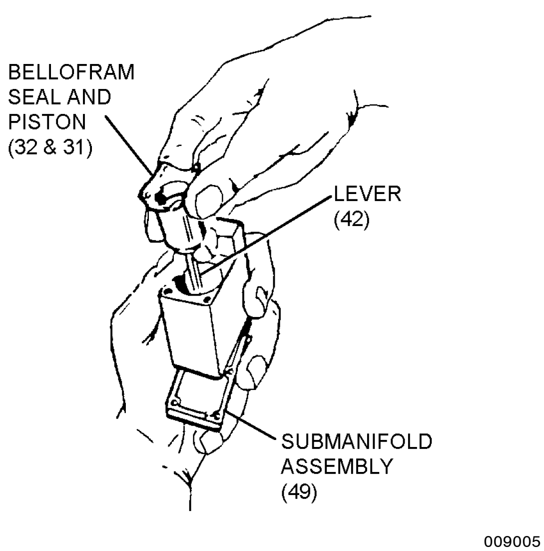

Figure 9-5. Seal and Lever Assembly

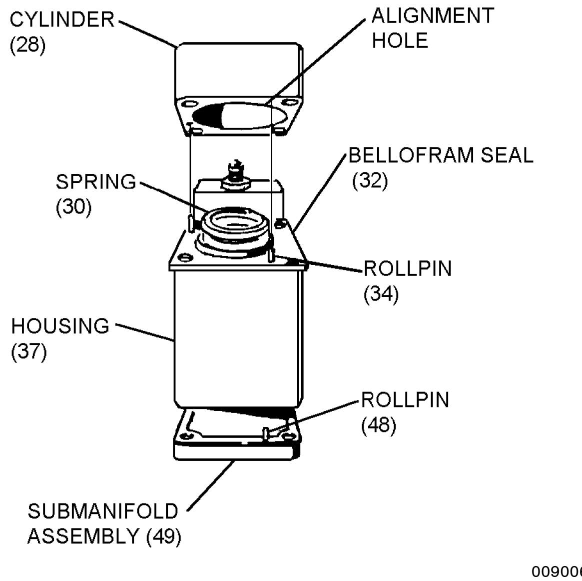

Figure 9-6. Seal Alignment

10. Align cylinder (28) with roll pins (34) and carefully install cylinder (28) onto housing (37) as shown in figure 9-6. Secure cylinder (28) to housing (37) using screws (26) and washers (27). Tighten screws (26) evenly.

11. (For P/N F103D000-1 only) Align and mate submanifold (49) to housing (37) so that roll pin (48) lines up with hole in housing (37) (figure 9-7). Secure manifold to housing with attaching parts (35 and 36) and tighten evenly.

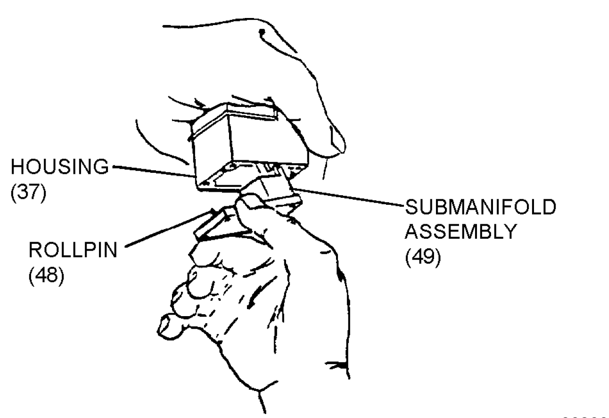

Figure 9-7. Aligning Housing and Submanifold Assembly

12. (For P/Ns F103D000-7 and F103D000-11) Install ring (11), O-ring (9), and O-ring (10) onto manifold (8). Align manifold (8) onto submanifold (49). Insert washers (7) and screws (6) through manifold (8) and submanifold (49). Carefully align and mate manifold (8 and 49) onto housing (37). Secure manifold and housing together using screws (6). Tighten all screws evenly.

13. (For P/N F103D000-15 only) Insert washers (7) and screws (6) through manifold (8). Carefully align and mate manifold (8) onto housing (37). Secure manifold and housing together using screws (6). Tighten all screws evenly.

14. Reinstall guide (22), O-ring (21), seat (20), valve (19), spring (18), retainer (17), O-ring (16A) into housing (37). Place pipe boss (16) onto housing (37) and secure with washers (15) and screws (14). Tighten screws evenly. Do not install safety wires (12 and 13).

15. Blow out all openings of manifold (8) with oil-free nitrogen at 25 psi maximum.

16. (For P/Ns F103D000-1, F103D000-7, and F103D000-11) Insert orifice (4) into manifold (8). Apply anti-seize tape to pipe threads of nipples (1).

17. (For P/N F103D000-15 only) Install O-ring (1A) onto nipples (1).

18. Reinstall filter (3), ring (2), and nipples (1) into unit.

19. Prior to bench testing, tighten screw (29) clockwise until 7 threads remain visible. Final adjustment of screw (29) will be completed during bench test. Install screen (25) and nut (24) onto screw (29). Do not tighten nut (24) and do not install nut (23) until instructed during bench test.

9-21. BENCH TEST.

NOTE

The bench test is performed on the Pressure Reducer every 896 days.

9-22. To bench test the pressure reducer assemblies using the oxygen systems components test stand, proceed as follows:

WARNING

For oxygen test stands, use only Nitrogen from grey cylinders marked "NITROGEN OIL FREE" in white letters. Two 3-inch wide black bands mark the top of these cylinders. Do not use 3500 psig Nitrogen cylinders. These cylinders cannot be certified contaminant free.

NOTE

All test procedures shall be accomplished using the models 1172AS100 or 1316AS100 Oxygen Systems Components Test Stands.

Tests are arranged so they proceed from one test to the next with a minimum of valve positioning changes. All part index numbers refer to figure 9-2 unless otherwise indicated.

Ensure pressure reducer assembly was delivered from squadron with inlet, outlet, gage, and relief fittings installed. Pressure reducer assembly shall be returned to the squadron or supply with inlet, outlet, gage, and relief fittings after Bench Test is completed.

9-23. HIGH PRESSURE LEAKAGE TEST. To perform the High Pressure Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Leak Detection, Type 1	MIL-L-25567
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen Systems Components Test Stand	1172AS100 or 1316AS100
2	Adapter Assembly	Fabricate IAW figure 9-7A

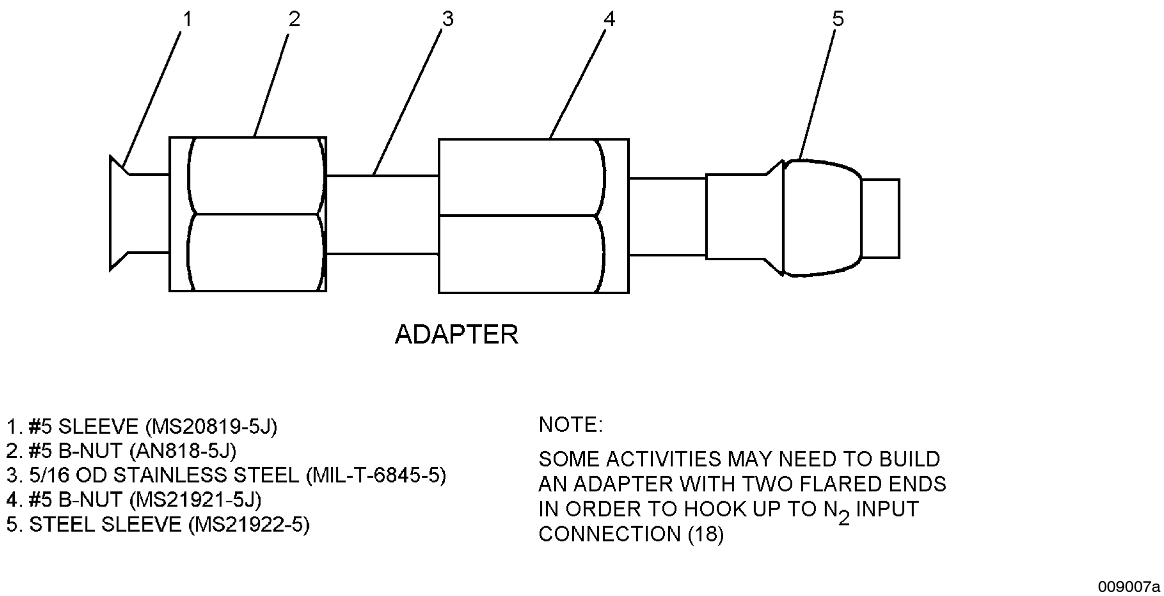

Figure 9-7A. Adapter

1. Ensure all test stand valves are properly secured.

2. Cap the outlet and gage ports of the pressure reducer assembly.

3. Connect the inlet port of the pressure reducer assembly to N_2 INPUT connection (18) in the altitude chamber using adapter (figure 9-7A) and fitting No. 4 to No. 5 or No. 5 to No. 5 as required.

4. Turn INLET PRESS. ON/OFF valve (L) on.

5. Using HIGH PRESS. REGULATOR (Q), slowly apply 1800 psig as indicated on REGULATED HIGH PRESS. gage (10).

6. Using leak detection compound check entire reducer for external leakage (figure 9-8). No leakage is allowed.

7. Turn HIGH PRESS. REGULATOR (Q) to vent.

8. Open SYSTEM BLEED valve (S) and bleed stand. Close valve (S).

9. Turn INLET PRESS. ON/OFF valve (L) off.

10. Disconnect pressure reducer assembly from N_2 INPUT connection (18). Proceed to next test.

9-24. SHUT-OFF VALVE TEST. To preform the Shut-off Valve Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen Systems Components Test Stand	1172AS100 or 1316AS100
2	Adapter Assembly	Fabricate IAW figure 9-7A

1. Connect the inlet port of the pressure reducer assembly to an outside source of 0 to 1800 psig regulated nitrogen (other than the test stand) using adapter (figure 9-7A) and fitting No. 4 to No. 5 or No. 5 to No. 5 as required.

2. Uncap the outlet port of the pressure reducer assembly and connect the outlet port to N_2 INPUT connection (18) using adapter (figure 9-7A) and fitting No. 4 to No. 5 or No. 5 to No. 5 as required.

3. Using 0 to 1800 psig regulated nitrogen source, apply 1800 psig to inlet port of pressure reducer assembly. Reading on N_2 INPUT PRESS. gage (27) shall be 60 to 75 psig. If pressure is not within limits, remove nut (23), loosen nut (24) and using a screwdriver, adjust screw (29) clockwise to increase outlet pressure or counterclockwise to decrease outlet pressure. (figure 9-9). After adjustments, replace nuts (23 and 24).

4. Observe N_2 PRESS. INPUT gage (27) for 6 minutes. Pressure indicated on gage shall not increase more than 2 psig. Proceed to next test.

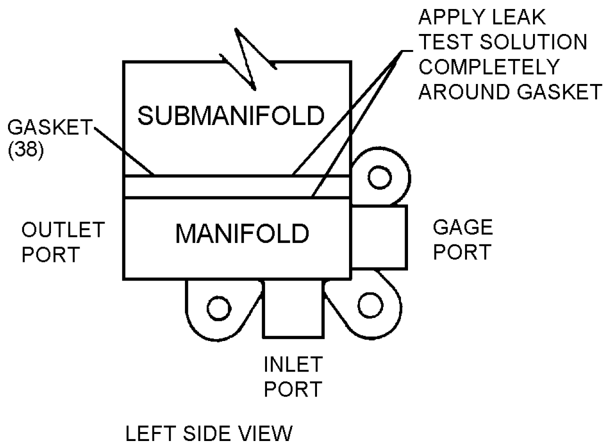

Figure 9-8. Leak Detection Compound Application

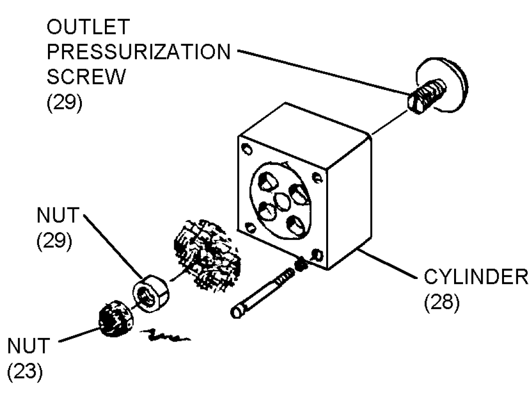

Figure 9-9. Outlet Pressure Adjusting Point for Reducer Shut-off Test

9-25. FLOW TEST. To perform the Flow Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen Systems Components Test Stand	1172AS100 or 1316AS100
2	Adapter Assembly	Fabricate IAW figure 9-7A

NOTE

Using the vent flow graph, convert a 130 lpm flow to inH_2O.

1. Place FLOW SELECTOR valve (M) in the SUIT SIMULATOR position.

2. Turn INLET PRESS. ON/OFF valve (L) on.

NOTE

When performing step 3, a pressure drop through the pressure reducer and suit simulator system on the oxygen component test stand will occur. A one minute stabilization period will be required after VENT PRESS. valve (H) is closed to achieve the 60 to 75 psig pressure reading on N_2 INPUT PRESS. gage (27).

3. Slowly open VENT PRESS. valve (H) until a 130 lpm flow is indicated on VENT FLOW manometer (3); pressure indicated on INPUT PRESS. gage (27) shall be at least 53 psig. Close VENT PRESS. valve (H); pressure indicated on N_2 PRESS. INPUT gage (27) shall be 60 to 75 psig.

4. Decrease inlet pressure to reducer assembly to 200 psig.

5. Slowly open VENT PRESS. valve (H) until a 130 lpm flow is indicated on VENT FLOW manometer (3); Pressure indicated on N_2 PRESS. INPUT gage (27) shall be at least 53 psig.

6. Close VENT PRESS. valve (H); pressure indicated on N_2 PRESS. INPUT gage (27) shall not exceed 75 psig.

7. Secure and bleed pressure from regulated nitrogen source.

8. Open SYSTEM BLEED valve (S) and bleed test stand and secure all test stand valves.

9. Disconnect pressure reducer assy inlet port from regulated nitrogen source and disconnect pressure reducer outlet port from N_2 INPUT connection (18). Proceed to next test.

9-26. OVERALL LEAKAGE TEST. To perform Overall Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen Systems Components Test Stand	1172AS100 or 1316AS100
2	Adapter Assembly	Fabricate IAW figure 9-7A

1. Connect the pressure reducer relief valve port to N_2 INPUT connection (18) using adapter (figure 9-7A) and fitting No. 4 to No. 5 or No. 5 to No. 5 as required.

2. Turn INLET PRESS. ON/OFF valve (L) on.

3. Using LOW PRESS. REGULATOR (N), apply 130 psig to the relief valve port.

4. Turn INLET PRESS. ON/OFF valve (L) off and observe N_2 INPUT PRESS. gage (27) for 2 minutes; pressure drop shall not exceed 2 psig.

5. Turn INLET PRESS. ON/OFF valve (L) to on.

6. Turn LOW PRESS. REGULATOR (N) counterclockwise, open SYSTEM BLEED valve (S) and bleed stand. Close (S).

7. Disconnect relief valve port from N_2 INPUT connection (18). Proceed to next test.

9-27. RELIEF VALVE TEST. To perform Relief Valve Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen Systems Components Test Stand	1172AS100 or 1316AS100
1	Wrench, Retainer	OT620
2	Adapter Assembly	Fabricate IAW figure 9-7A

1. Connect pressure reducer outlet port to N_2 INPUT connection (18) using adapter (figure 9-7A) and fitting No. 4 to No. 5 or No. 5 to No. 5 as required.

2. Cap pressure reducer inlet and gage ports.

3. Turn INLET PRESS. ON/OFF valve (L) on.

4. Using LOW PRESS. REGULATOR (N), apply 130 to 160 psig to the outlet port and observe REGULATED LOW PRESS. gage (11); record pressure from REGULATED LOW PRESS. gage (11) at which the relief valve unseats.

5. Using LOW PRESS. REGULATOR (N), increase pressure to 160 to 170 psig, then slowly decrease pressure until relief valve reseats; record pressure on N_2 INPUT PRESS. gage (27); pressure shall not be less than 115 psig. If relief valve operating pressures cannot be obtained, use retainer wrench to adjust retainer (17) until proper reading can be obtained (figure 9-10).

6. Repeat steps 4 and 5 two more times.

7. Turn LOW PRESS. REGULATOR (N) counterclockwise, open SYSTEM BLEED valve (S) and bleed test stand. Close INLET PRESS. ON/OFF valve (L), SYSTEMS BLEED valve (S) and disconnect pressure reducer from N_2 INPUT connection (18). Proceed to next test.

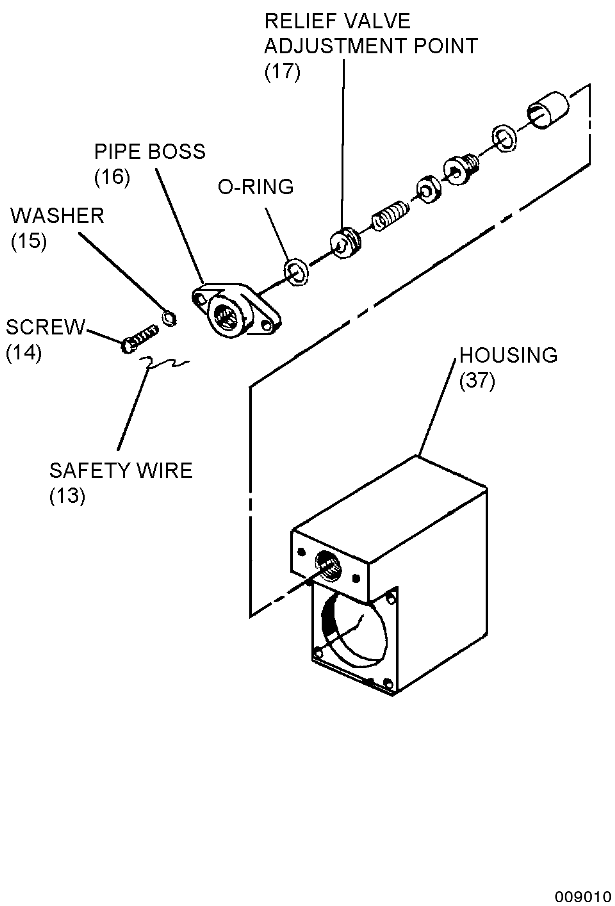

Figure 9-10. Relief Valve Adjustment Point for Operating Pressure and Flow Test

9-28. RELIEF VALVE FLOW TEST. To perform the Relief Valve Flow Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen Systems Components Test Stand	1172AS100 or 1316AS100
2	Adapter Assembly	Fabricate IAW figure 9-7A

NOTE

Using vent graph, convert a 30 lpm flow to H_2O.

1. Connect the pressure reducer outlet port to a 0 to 1800 psig regulated nitrogen source (other than the oxygen systems components test stand) using adapter (figure 9-7A) and fitting No. 4 to No. 5 or No. 5 to No. 5 as required.

2. Connect the pressure reducer relief valve port to N_2 INPUT connection (18) using adapter (figure 9-7A) and fitting No. 4 to No. 5 or No. 5 to No. 5 as required.

3. Place FLOW SELECTOR valve (M) in the SUIT SIMULATOR position.

4. Turn INLET PRESS. ON/OFF valve (L) on.

5. Open VENT PRESS. valve (H).

6. Using external regulated 0 to 1800 nitrogen source, slowly apply 170 psig as indicated on external regulator OUTLET PRESS. gage, VENT FLOW manometer (3) shall indicate at least 30 lpm flow.

7. Secure regulated nitrogen source.

WARNING

Depending on regulator being used with external regulated nitrogen source, it may be necessary to perform the following in order to bleed pressure from pressure reducer instead of performing step 9.

Turn T-handle on regulator attached to external nitrogen source counterclockwise, then slowly disconnect hose attached to the outlet port of the pressure reducer assembly to bleed pressure.

8. Open SYSTEM BLEED valve (S) and bleed test stand. Disconnect pressure reducer from test stand and secure all test stand valves.

9. Proceed to next test.

9-29. HIGH PRESSURE LEAKAGE TEST. To perform the High Pressure Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Leak Detection, Type 1	MIL-L-25567
As Required	Lockwire	MS20995C20-4
As Required	Lockwire	MS20995C20-8
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen Systems Components Test Stand	1172AS100 or 1316AS100
2	Adapter Assembly	Fabricate IAW figure 9-7A

1. Cap the pressure reducer outlet port.

2. Uncap the pressure reducer inlet port and connect the inlet port to N_2 INPUT connection (18) using adapter (figure 9-7A) and fitting No. 4 to No. 5 or No. 5 to No. 5 as required.

3. Turn INLET PRESSURE ON/OFF valve (L) ON.

4. Using HIGH PRESS. REGULATOR (Q), slowly apply 1800 psig to the pressure reducer assembly.

5. Using leak detection compound, check the two main body gaskets for leakage (figure 9-8). No leakage is allowed.

6. Turn HIGH PRESS. REGULATOR (Q) to vent.

7. Open SYSTEM BLEED valve (S) and bleed pressure from test stand. Secure all test stand valves and disconnect pressure reducer assembly from test stand.

8. Ensuring retainer (17) does not turn, reassemble pipe boss (16) and O-ring (16A) to housing (37) with screws (14) and washers (15).

9. Install new lockwires (12 and 13) as in accordance with figure 9-11.

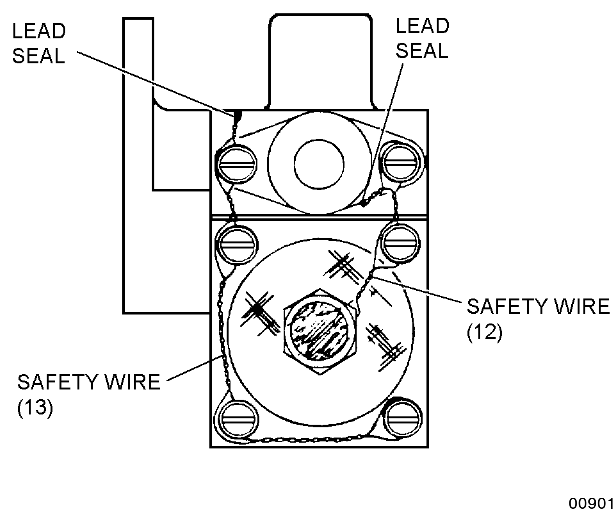

Figure 9-11. Safety Wire Installation Diagram

Section 9-4. Illustrated Parts Breakdown

9-30. GENERAL.

9-31. This section lists and illustrates the assemblies and detail parts associated with the Pressure Reducer Assemblies, P/N F103D000-1, F103D000-7, F103D000-11, and F103D000-15.

9-32. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

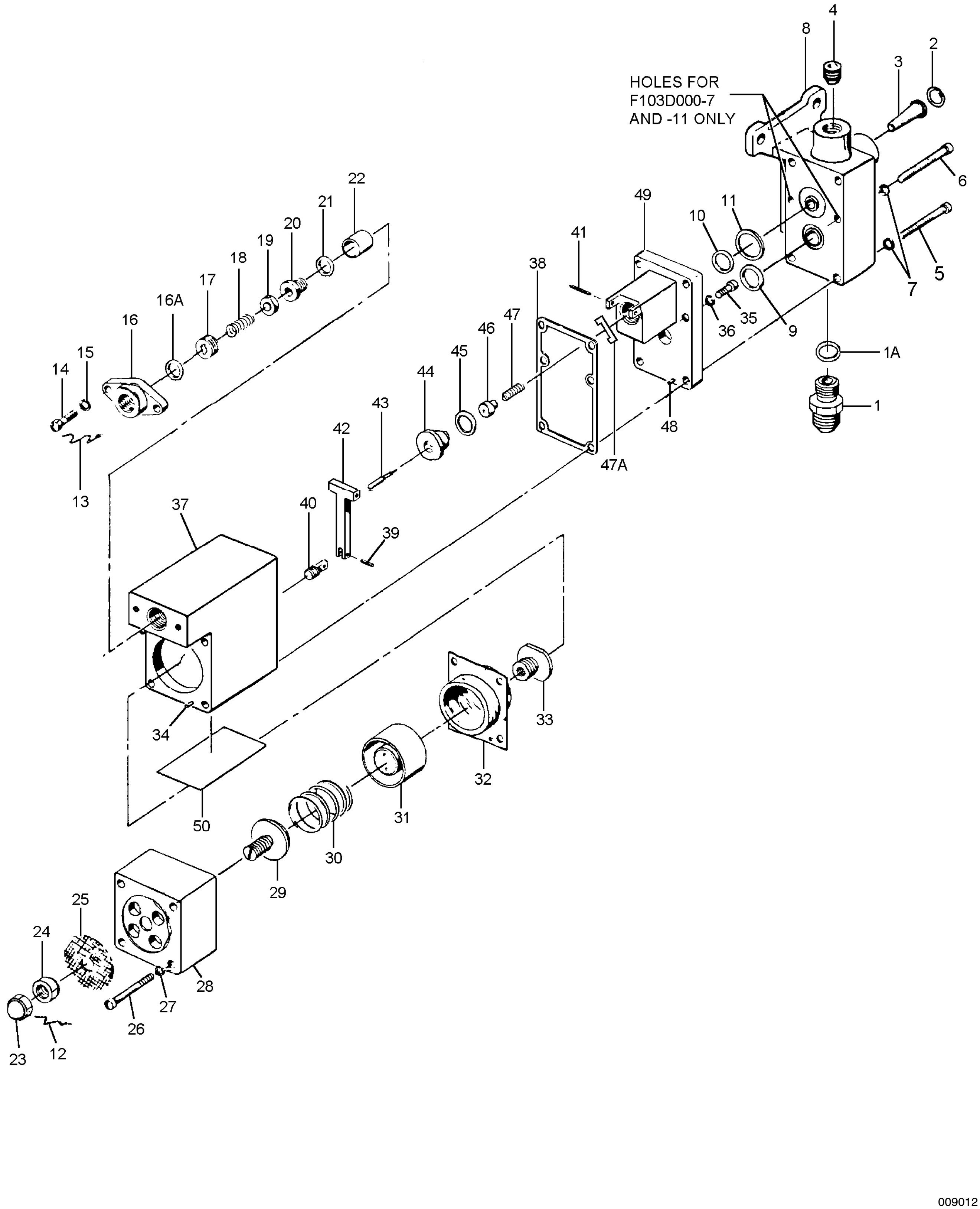

Figure 9-12. Reducing Valve, P/Ns F103D000-1, F103D000-7, F103D000-11, and F103D000-15, IPB

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
9-12	F103D000-1	REDUCING VALVE	REF	A
	F103D000-7	REDUCING VALVE	REF	B
	F103D000-11	REDUCING VALVE	REF	C
	F103D000-15	REDUCING VALVE	REF	D
	F103D005-1	. REDUCING VALVE ASSEMBLY	1	A
	F103D005-7	. REDUCING VALVE ASSEMBLY	1	B
	F103D005-11	. REDUCING VALVE ASSEMBLY	1	C
	F103D005-15	. REDUCING VALVE ASSEMBLY	1	D
-1	AN816-5C	. . NIPPLE	4	AB
	ER816-5C	. . NIPPLE (79470)	4	C
	MS21902J5	. . NIPPLE	4	D
-1A	1000-0004-905	. . O-RING	4	D
-2	0-521-72A	. . RING	1	
-3	14898	. . FILTER	1	
-4	F103D011-1	. . ORIFICE	1	
-5	AN500A6-22	. . SCREW	4	A
-6	FS106-632-12	. . SCREW	6	BC
	MS16995-18	. . SCREW	6	D
-7	AN935-6L	. . WASHER	4	A
	AN935-6L	. . WASHER	6	BC
-8	F103D004-1	. . MANIFOLD	1	A
	F103D004-3	. . MANIFOLD	1	BC
	B40872-1	. . BODY	1	D
-9	14909-7	. . O-RING	1	
-10	14909-6	. . O-RING	1	
-11	16276	. . RING	1	
-12	MS20995C20-4	. . WIRE	1	
-13	MS20995C20-8	. . WIRE	1	
-14	AN500A6-8	. . SCREW	2	ABC
	MS35265-28	. . SCREW	2	D
-15	AN935-6L	. . WASHER	2	
-16	17842	. . PIPE BOSS	1	ABC
	B40877-1	. . BOSS OVERFLOW	1	D
-16A	15697	. . O-RING	1	
-17	17948-1	. . RETAINER	1	
-18	F3981032	. . SPRING	1	
-19	17947	. . VALVE ASSEMBLY	1	
-20	16681	. . SEAT	1	
-21	14909-4	. . O-RING	1	
-22	16682	. . GUIDE	1	BC
-23	17887	. . NUT	1	
-24	AN315D4R	. . NUT	1	
-25	16904	. . SCREEN	1	
-26	AN500A6-20	. . SCREW	4	ABC
	B40954-1	. . SCREW	4	D
-27	AN935-6L	. . WASHER	4	
-28	16405	. . CYLINDER	1	ABC
	16405-3	. . CYLINDER	1	D

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
9-12-29	16691	. . SCREW	1	
-30	16541	. . SPRING	1	
-31	17954	. . PISTON	1	
-32	17857	. . BELLOFRAM SEAL	1	
-33	17952	. . SCREW	1	
-34	17860	. . ROLL PIN	1	
-35	AN500A6-8	. . SCREW	2	A
-36	AN935-6L	. . WASHER	2	A
-37	17865-1	. . HOUSING	1	ABC
	17865-3	. . HOUSING	1	D
-38	17859	. . GASKET	1	
-39	17860	. . ROLL PIN	1	
-40	17848	. . SCREW	1	ABC
	MS21902J5	. . ADAPTER, Straight	1	D
-41	17864	. . ROLL PIN	1	
-42	17849	. . LEVER	1	
-43	17956	. . PIN	1	
-44	17929	. . SEAT ASSEMBLY	1	ABC
	17929-3	. . SEAT ASSEMBLY	1	D
-45	14909-7	. . O-RING	1	A
	F388-1157-1	. . O-RING	1	BC
-46	17958-1	. . VALVE	1	
-47	16727	. . SPRING	1	
-47A	B40879-1	. . SPRING GUIDE	1	D
-48	17860	. . ROLL PIN	1	
-49	17974	. . SUBMANIFOLD	1	
-50	F103D014-1	. . IDENTIFICATION PLATE	1	A
	F103D014-3	. . IDENTIFICATION PLATE	1	B
	F346-1151-1	. . IDENTIFICATION PLATE	1	C
	B40876-1	. . IDENTIFICATION PLATE	1	D
	F419-1020-3	OVERHAUL HARDWARE KIT	1	ABC
	B42493-1	OVERHAUL KIT	1	D
	F418-1020-2	CURE DATE ITEMS KIT	1	ABC

NUMERICAL INDEX

Part Number	Figure and Index Number	SM&R Code
AN315D4R	9-12-24	
AN500A6-8	9-12-14	
	9-12-35	
AN500A6-20	9-12-26	
AN500A6-22	9-12-5	
AN816-5C	9-12-1	
AN935-6L	9-12-7	
	9-12-15	
	9-12-27	
	9-12-36	
B40872-1	9-12-8	
B40876-1	9-12-50	
B40877-1	9-12-16	
B40879-1	9-12-47A	
B40954-1	9-12-26	
B42493-1	9-12-50	
ER816-5C	9-12-1	
FS106-632-12	9-12-6	
F103D000-1	9-12	
F103D000-11	9-12	
F103D000-7	9-12	
F103D004-1	9-12-8	
F103D004-3	9-12-8	
F103D005-1	9-12	
F103D005-11	9-12	
F103D005-15	9-12	
F103D005-7	9-12	
F103D011-1	9-12-4	
F103D014-1	9-12-50	
F103D014-3	9-12-50	
F346-1151-1	9-12-50	
F388-1157-1	9-12-45	
F3981032	9-12-18	
F418-1020-2	9-12-50	
F419-1020-3	9-12-50	
MS16995-18	9-12-6	
MS20995C20-4	9-12-6	
MS20995C20-8	9-12-13	
MS21902J5	9-12-1	
	9-12-40	
MS35265-28	9-12-14	
0-521-72A	9-12-2	
14898	9-12-3	
14909-4	9-12-21	
14909-6	9-12-10	
14909-7	9-12-9	
	9-12-45	
15697	9-12-16A	
16276	9-12-11	
16405	9-12-28	
16405-3	9-12-28	
16541	9-12-30	
16681	9-12-20	
16682	9-12-22	
16691	9-12-29	
16727	9-12-47	
16904	9-12-25	
17842	9-12-16	
17848	9-12-40	
17849	9-12-42	
17857	9-12-32	
17859	9-12-38	
17860	9-12-34	
	9-12-39	
	9-12-48	
17864	9-12-41	
17865-1	9-12-37	
17865-3	9-12-37	
17887	9-12-23	
17929	9-12-44	
17929-3	9-12-44	
17947	9-12-19	
17948-1	9-12-17	
17952	9-12-33	
17954	9-12-31	
17956	9-12-43	
17958-1	9-12-46	
17974	9-12-49	

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CHAPTER 10

HIGH PRESSURE OXYGEN MANIFOLD AND CHECK VALVE ASSEMBLY

P/Ns 2140, 2150, AND 2170

Section 10-1. Description

10-1. GENERAL.

10-2. The High Pressure Oxygen Manifold and Check Valve Assembly (P/Ns 2140, 2150 and 2170) is manufactured by Carleton Technologies, Inc. and American Flight Safety Systems, Inc. (CAGE 31441) for use on the P-3 series aircraft (figure 10-1).The manifold and check valve assembly is designed for routing system high pressure oxygen to the aircraft pressure reducer assembly and to serve as a connection for filling of oxygen cylinders installed in the aircraft. Table 10-1 contains leading particulars for the high pressure oxygen manifold and check valve assembly.

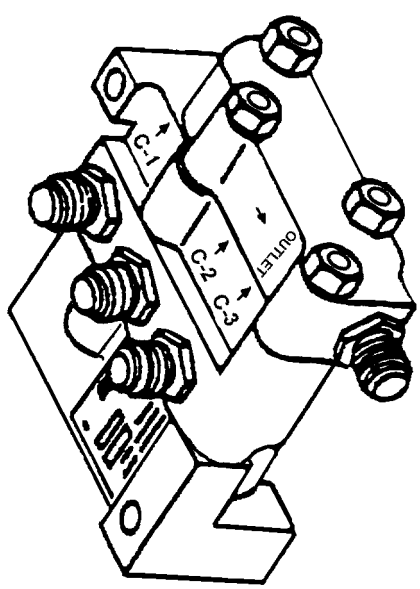


Figure 10-1. High Pressure Oxygen Manifold and Check Valve Assembly

Table 10-1. Leading Particulars for High Pressure Oxygen Manifold and Check Valve Assembly

P/N 2140 Without Adapters	
P/N 2150 Fitting Adapters	AN816-5K
P/N 2170 Fitting Adapters	ER816-5J
Ports	C1, C2, C3, Outlet, Filler
Weight	14 oz
Height	1 1/2 in.
Length	3 in.
Width	3 1/4 in.
Operating Pressure Range	50 to 2100 psig

10-3. CONFIGURATION.

10-4. The manifold and check valve assembly (P/N 2140) is supplied in two basic configurations, with each performing the same function. P/N 2150 utilizes 5 adapters (P/N AN816-5K or -5J) for mating the manifold and check valve to the aircraft system. P/N 2170 utilizes adapter P/N ER-816-5J for this function.

10-5. FUNCTION.

10-6. The manifold and check valve assembly filler port is connected to the aircraft oxygen high pressure check valve, ports C1, C2, and C3 are connected to the three aircraft oxygen supply cylinders, and the outlet port is connected to the system oxygen pressure reducer assembly and system high pressure oxygen gage. The manifold assembly incorporates six gravity fed check valves which prevent the flow of oxygen from one cylinder to another and from the oxygen cylinders back through the manifold filler valve. The manifold assembly outlet port routes system oxygen to the high pressure gage and oxygen pressure reducer assembly. (figure 10-2).

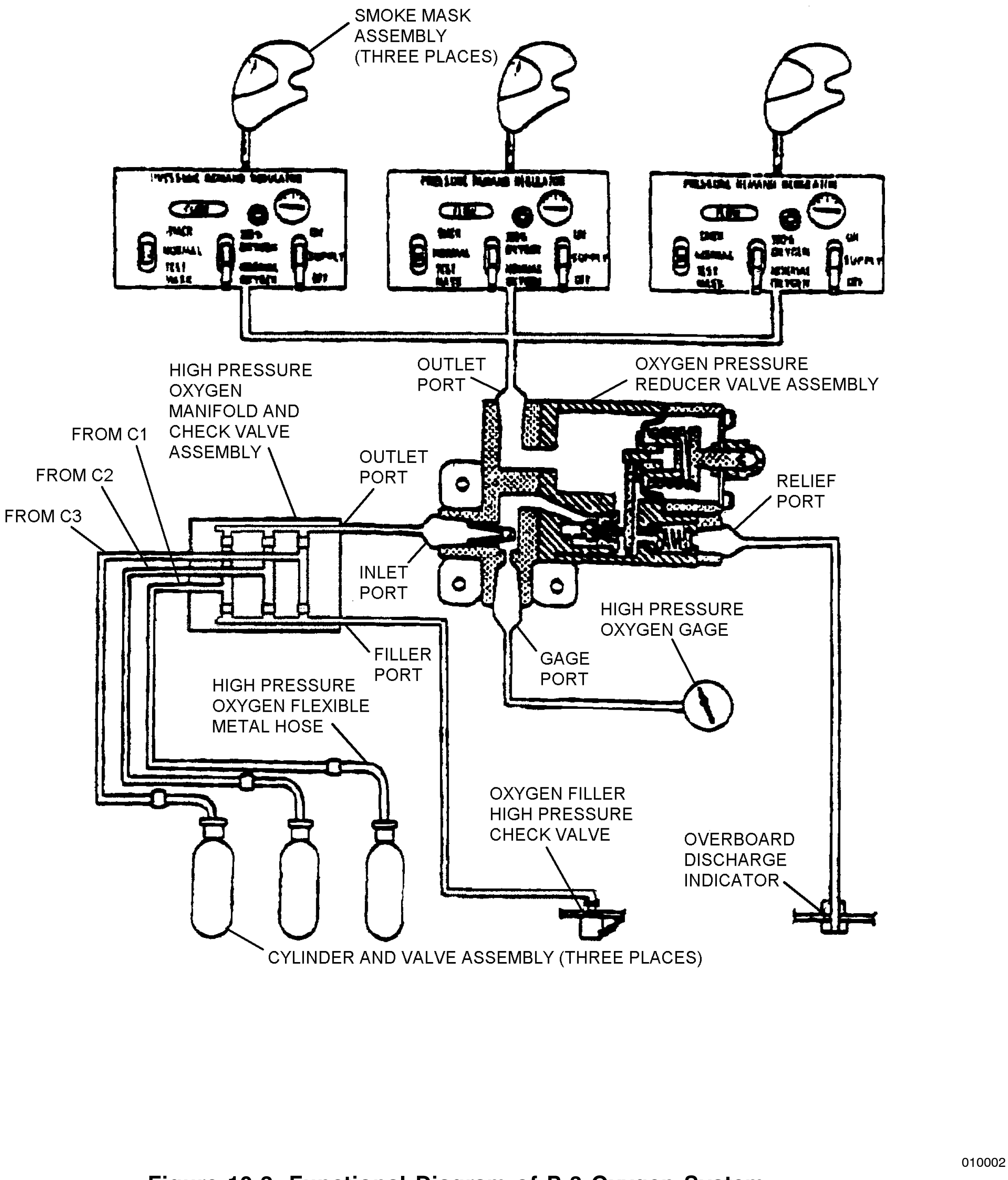


Figure 10-2. Functional Diagram of P-3 Oxygen System

10-7. SERVICE LIFE.

10-8. The manifold and check valve assembly shall remain in service as long as repair cost does not exceed 75% of cost of the valve.

10-9. REFERENCE NUMBERS, ITEMS, AND SUPPLY DATA.

10-10. Section 10-5, Illustrated Parts Breakdown, contains information on each assembly, subassembly and component part of the manifold assembly. The figure and index number, reference or part number, description and units per assembly are provided with the breakdown.

Section 10-2. Modifications

10-11. GENERAL.

10-12. No modifications to this valve assembly are required or authorized at this time.

Section 10-3. Performance Test Sheet Preparation

10-13. GENERAL.

10-14. Flows provided in applicable directives are stated in liters per minute (lpm) and are not measurable by the manometers used in oxygen system component test stands. Flows must be converted to inches of water (inH_2O), the form of measurement which can be read on test stand manometers.

NOTE

The various graphs supplied with each test stand, Models 1172AS100 and 1316AS100 are used in converting flows. These graphs are not interchangeable between test stands. A new set of graphs will be provided each time the test stand is calibrated.

10-15. The information provided in the tables in this section is to be recorded on the Performance Test Sheet (figure 10-3).

10-16. The Performance Test Sheet is a sample only but may be reproduced for local use.

10-17. The following test requires conversion of flow from actual lpm to indicated inH_2O.

1. Check Valve and Outlet Flow Test. To convert the actual 50 liter per minute flow to inH_2O, proceed as follows:

a. Using the vent flow graph, find 50 lpm at bottom of graph, trace up to nitrogen line on the graph, then to the left for equivalent inH_2O flow.

b. Record inH_2O flow on Performance Test Sheet in space provided.

10-18. The following tests require no conversion flows:

1. External Leakage Test
2. Outlet Flow Check Valve Leakage Test
3. Filler Flow Check Valve Leakage Test
4. Oxygen Purge

PERFORMANCE TEST SHEET
HIGH PRESSURE OXYGEN MANIFOLD AND CHECK VALVE ASSEMBLY
PART NUMBERS 2140, 2150, AND 2170

Date: ____________ Part No. ____________ Manifold Serial No. ________________ Test Stand Serial No. __________

Test Stand Operator ______________________________ Inspected By (CDI/QAR) ______________________________

1. External Leakage Test:

   A. 500 psig (No leakage allowed) ________________________

   B. 1500 psig (No leakage allowed) ________________________

2. Outlet Flow Check Valve Leakage Test: (50 and 1000 psig applied to outlet 50 CCM maximum leak)

   A. C1 Port Leakage: 50 psig ________ 1000 psig ________

   B. C2 Port Leakage: 50 psig ________ 1000 psig ________

   C. C3 Port Leakage: 50 psig ________ 1000 psig ________

3. Filler Flow Check Valve Leakage Test: (50 and 1000 psig applied to ports C1, C2, C3 50 CCM maximum leak)

   A. C1 Port Leakage: 50 psig ________ 1000 psig ________

   B. C2 Port Leakage: 50 psig ________ 1000 psig ________

   C. C3 Port Leakage: 50 psig ________ 1000 psig ________

4. Flow Check Valve and Outlet Flow Test: (140 psig, 50 LPM ________ inH_2O, 20 psig Difference)

   A. C1 Port: N_2 Input Press Gage (27) Reading ______________

   B. C2 Port: N_2 Input Press Gage (27) Reading ______________

   C. C3 Port: N_2 Input Press Gage (27) Reading ______________

   D. Outlet Port: N_2 Input Press Gage (27) Reading ____________

5. Manifold and Check Valve Assembly Purge: (200 psig Aviators Breathing Oxygen for 3 minutes)

Figure 10-3. Manifold and Check Valve Assembly Performance Test Sheet

Section 10-4. Maintenance

10-19. GENERAL.

10-20. This section contains the procedural steps for inspecting, testing, disassembly, cleaning, and assembly of the manifold and check valve assembly.

10-21. Procedural steps outlined in this section are listed as they are required, and in the sequence in which they occur.

NOTE

The manifold assembly shall be considered beyond economical repair when cost of repair parts exceeds approximately 75% of the cost of manifold and check valve assembly.

Upon completion of any maintenance action (e.g. inspection, repair, modification, etc.), be sure to make necessary entries on appropriate forms in accordance with OPNAVINST 4790.2 Series.

10-22. INSPECTION.

10-23. SPECIAL INSPECTION. The Special Inspection consists of a visual inspection performed in conjunction with the aircraft inspection requirements for aircraft in which the manifold and check valve assembly is installed. To perform the inspection, visually inspect the following:

1. Legibility of all markings.

2. Manifold assembly and surrounding area for freedom from dirt, grease, oil, hydraulic fluid, and other hydrocarbons.

3. Line Connections for security of attachment and good conditions.

4. Manifold assembly for obvious damage and good condition.

10-24. BENCH TEST.

10-25. To Bench Test the manifold and check valve assembly, proceed as follows:

WARNING

Because of possible vacuum pump explosion, only Water Pumped Nitrogen, Type 1, Class 1, Grade B (Fed Spec BB-N-411) shall be used when testing oxygen components.

For oxygen test stands, use only Nitrogen from gray cylinders marked NITROGEN OIL FREE in white letters. Two 3 inch wide black bands mark the top of these cylinders. Do not use 3500 psig cylinders as these cylinders are components of Nitrogen Serving Trailers and cannot be certified contaminant free.

Prior to performing Bench Test on manifold assemblies that have been inducted for scheduled or unscheduled maintenance, the manifold assembly shall be disassembled and cleaned and reassembled in accordance with paragraphs 10-32 through 10-41.

NOTE

Oxygen Systems Components Test Stand Model 1172AS100 or 1316AS100 shall be used for performing Bench Test. Do not attempt to operate test stand without first becoming familiar with operation of test stand. Refer to appropriate ground support equipment manual.

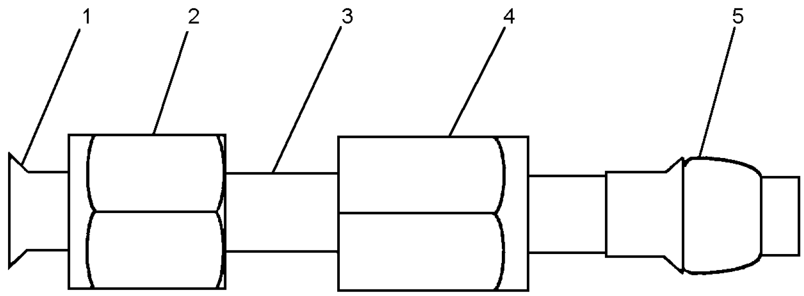
A high pressure source of nitrogen, other than the test stand, will be needed when performing some of the required tests.

The Bench Test shall be performed prior to placing the manifold and check valve assembly in service, in accordance with aircraft inspection cycle every 448 days or after any unscheduled repair action. The Performance Test Sheet (figure 10-3) may be reproduced and used for recording readings.

10-26. EXTERNAL LEAKAGE TEST. To perform the External Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Leak Detection, Type 1	MIL-L-25567
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

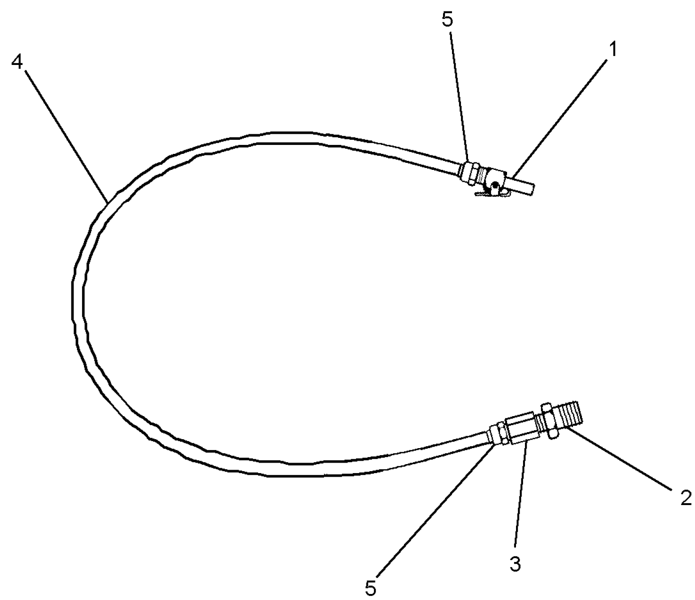


ADAPTER
VIEW A

1. #5 SLEEVE (MS20819-5J)
2. #5 B-NUT (AN818-5J)
3. 5/16 OD STAINLESS STEEL (MIL-T-6845-5)
4. #5 B-NUT (MS21921-5J)
5. STEEL SLEEVE (MS21922-5)

NOTE:

SOME ACTIVITIES MAY NEED TO BUILD AN ADAPTER WITH TWO FLARED ENDS IN ORDER TO HOOK UP TO N_2 INPUT CONNECTION (18)



LINE ASSEMBLY
VIEW B

1. QUICK DISCONNECT (F361-1339-1)
2. ADAPTER (AN816-5K) OR NIPPLE (ER816-5J)
   (DEPENDING ON P/N 2150 OR P/N 2170 BEING TESTED)
3. POLY FLO FEMALE CONNECTOR (266P1/4 IN X 1/8 IN) (266-P04 X 02)
4. 1/4 IN POLY FLO TUBING
5. POLY FLO NUT AND SLEEVE ASSEMBLY (261-P04)

010004

Figure 10-4. Adapter and Line Assembly

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter Assembly	Fabricate IAW figure 10-4
1	Oxygen Systems Components Test Stand	1172AS100 or 1316AS100

1. Ensure manifold assembly has been disassembled, cleaned, lubricated and reassembled and was received from squadron with appropriate fittings for the filler, C1, C2, C3, and outlet ports. The high pressure manifold assembly shall be returned to the squadron or supply with fittings installed in the filler, C1, C2, C3, and outlet ports after the Bench Test has been completed.

2. Cap outlet and bottle ports C1, C2, and C3 of the manifold assembly.

3. Connect filler port of manifold assembly to N_2 INPUT connection (18) in altitude chamber using adapter (figure 10-4) and flared fitting No. 4 to No. 5 or No. 5 to No. 5, as required.

4. Ensure all test stand valves and regulators are properly secured and open nitrogen cylinder. Cylinder pressure indicated on SUPPLY PRESSURE gage (9) shall be at least 1500 psig.

5. Position manifold assembly in altitude chamber and close altitude chamber door.

6. Turn INLET PRESS. ON/OFF valve (L) to ON position.

7. Using HIGH PRESS. regulator (Q), slowly apply 500 psig to manifold assembly.

WARNING

Prior to use, inspect leak detection compound. Compound which is not clear and free from suspended materials/sediment is considered contaminated and shall be disposed of.

8. Open altitude chamber door. Apply leak detection compound to all fittings and body seams to check for leakage. No leakage is allowed. Record results on Performance Test Sheet.

9. Reposition manifold in altitude chamber and close altitude chamber door.

10. Using HIGH PRESS. regulator (Q), slowly apply 1500 psig to manifold assembly as indicated on REGULATED HIGH PRESS. gage (10).

11. Open altitude chamber door. Apply leak detection compound to all fitting and body seams to check for leakage. No leakage is allowed. Record results on Performance Test Sheet.

12. Turn HIGH PRESS. regulator (Q) to vent and open SYSTEM BLEED Valve (S) to bleed pressure from manifold assembly.

13. Close SYSTEM BLEED. valve (S) and turn INLET PRESS. ON/OFF valve (L) to OFF.

14. Dry manifold assembly of all leak detection compound.

15. If manifold assembly failed external leakage test, refer to troubleshooting (table 10-2). If no leakage occurred, proceed to next test.

10-27. OUTLET FLOW CHECK VALVE LEAKAGE TEST. To perform the Outlet Flow Check Valve Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen Systems Components Test Stand	1172AS100 or 1316AS100

CAUTION

The manifold assembly shall be positioned with C1, C2, and C3 arrows pointing up during the entire bench test to allow poppets to seat properly.

1. Disconnect filler port from N_2 INPUT Connection (18) in altitude chamber.

Table 10-2. Troubleshooting (External Leakage Test)

Trouble	Probable Cause	Remedy
C1, C2, C3, outlet and filler ports leaking.	Adapters (1) loose, threads stripped or scarred nipple seating surface.	Tighten adapter (1) or replace.
Leakage between upper, inner, and lower bodies.	Bolts (2) loose or stripped; packing damaged.	Torque bolts (2) to 150 in-lb or replace bolts (2). Replace packing (3).
	Stripped threads in lower body (8). Damaged upper body (4) or inner body (6).	Replace defective body assembly as necessary.
Notes: 1. Unless otherwise noted, index numbers in parentheses refer to figure 10-6.		

2. Remove caps from C1, C2, and C3 ports.

3. Connect adapter and line assembly (figure 10-4) from C3 port to 20 to 200 CCM leakage connection (20) in altitude chamber. Turn INLET PRESS. ON/OFF valve to ON.

4. (Oxygen test stand model 1316AS100 only.) Place overboard ON/OFF valve (T) to ON position.

5. Remove cap from manifold outlet port and connect manifold outlet port to N_2 INPUT connection (18) in altitude chamber.

6. Using LOW PRESS. regulator (N), slowly apply 50 psig to manifold outlet port, as indicated on N_2 inlet pressure gage (27). Observe OVERBOARD LEAKAGE rotameter (6). Maximum allowable leakage is 50 CCM. Record reading on Performance Test Sheet.

7. Back out (counterclockwise) on LOW PRESS regulator (N) until spring tension is released.

8. Close altitude chamber door.

9. Using HIGH PRESS. regulator (Q), slowly apply 1000 psig to manifold outlet port, as indicated on REGULATED HIGH PRESS. gage (10). Observe OVERBOARD LEAKAGE rotameter (6). Maximum allowable leakage is 50 CCM. Record reading on Performance Test Sheet.

10. Turn HIGH PRESS. regulator (Q) to vent open SYSTEM BLEED valve (S).

11. Open chamber door.

12. Disconnect line form C3 port and connect to C2 port.

13. Repeat steps 5 through 11.

14. Disconnect line from C2 port and connect to C1 port.

15. Repeat steps 5 through 11.

16. Disconnect adapter and line assembly from 20 to 200 LEAKAGE connection (20) and manifold C1 port. Disconnect manifold outlet port from N_2 INPUT connection (18) in altitude chamber. Secure all test stand valves.

17. If leakage occurred during test, refer to troubleshooting (table 10-3). If no leakage was present, proceed to next test.

10-28. FILLER FLOW CHECK VALVE LEAKAGE TEST. To perform the Filler Flow Check Valve Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Table 10-3. Troubleshooting (Outlet Flow Check Valve Leakage Test)

Trouble	Probable Cause	Remedy
C1, C2, and C3 ports have leakage in excess of 50 CCM.	Poppets in Inner Body (6) dirty or damaged.	Clean or replace Poppets (5).
	Poppet seating surface in Inner body (6) dirty or damaged.	Clean or replace Inner Body.
Notes: 1. Unless otherwise noted, index numbers in parentheses refer to figure 10-6.		

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter Assembly	Fabricate IAW figure 10-4
1	Oxygen Systems Components Test Stand	1172AS100 or 1316AS100

1. Cap outlet port of manifold and check valve assembly.

2. Cap C1 and C2 ports.

3. Connect C3 port to N_2 INPUT connection (18) in altitude chamber.

4. Using adapter and line assembly (figure 10-4), connect filler port to 20 to 200 LEAKAGE connection (20) in altitude chamber.

5. Position manifold check valve assembly in altitude chamber and close door.

6. Turn INLET PRESS. ON/OFF valve (L) ON.

7. Using LOW PRESS. regulator (N), slowly apply 50 psig to C3 port as indicated on N_2 INPUT PRESS. gage (27).

8. Record leakage from OVERBOARD LEAKAGE rotameter (6) on Performance Test Sheet. Leakage shall not exceed 50 CCM.

9. Back out (counterclockwise) on LOW PRESS. regulator (N) until spring tension is released.

10. Using HIGH PRESS. regulator (Q), slowly apply 1000 psig to manifold C3 port as indicated on REGULATED HIGH PRESS. gage (10).

11. Record leakage from OVERBOARD LEAKAGE rotameter (6) on Performance Test Sheet. Leakage shall not exceed 50 CCM.

12. Turn HIGH PRESS. regulator (Q) to VENT position, open SYSTEM BLEED valve (S) and bleed pressure from regulated high pressure system. Close SYSTEM BLEED valve (S).

13. Disconnect C3 port from N_2 INPUT connection (18).

14. Remove cap from C2 port N_2 INPUT connection (18).

15. Cap C3 port and reposition manifold assembly in altitude chamber.

16. Repeat steps 4 through 12.

17. Disconnect C2 port from N_2 INPUT connection.

18. Remove cap from C1 port and cap C2 port.

19. Connect C1 port from N_2 INPUT connection.

20. Repeat steps 4 through 12.

21. Disconnect C1 port from N_2 INPUT connection (18).

Table 10-4. Troubleshooting (Filler Flow Check Valve Leakage Test)

Trouble	Probable Cause	Remedy
Manifold assembly has leakage in excess of 50 CCM.	Poppets (5) in lower body dirty or damaged.	Clean or replace poppets (5).
	Poppet seating surface in lower body (8) dirty or damaged.	Clean or replace lower body (8).
Notes: 1. Unless otherwise noted, index numbers in parentheses refer to figure 10-6.		

22. Turn INLET PRESS. valve (L) to OFF.

23. Disconnect filler port from 20 to 200 CC LEAKAGE connection (20) and disconnect adapter form filler port.

24. (Oxygen test stand model 1316AS100 only.) Place overboard ON/OFF valve (T) to OFF position.

25. If leakage occurred, refer to troubleshooting (table 10-4). If leakage was not present, proceed to next test.

10-29. CHECK VALVE AND OUTLET FLOW TEST. To perform the Check Valve and Outlet Flow Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen Systems Components Test Stand	1172AS100 or 1316AS100

1. Connect N_2 Regulator Model 8-250 or equivalent to outside source of high pressure nitrogen supply, other than test stand.

2. Cap manifold C2, C3 and outlet ports.

3. Connect manifold filler port to outside source of high pressure nitrogen.

4. Connect manifold C1 port to N_2 INPUT connection (18) in altitude chamber and position manifold assembly in altitude chamber.

5. Turn INLET PRESS. ON/OFF valve (L) to ON and place FLOW SELECTOR valve (M) in the SUIT SIMULATOR position.

6. Open cylinder supplying outside source of nitrogen.

7. Using Nitrogen Regulator Model 8-250, slowly apply 140 psig to manifold assembly as indicated on nitrogen supply output gage and N_2 INPUT PRESS. gage (27) in altitude chamber.

NOTE

When performing step 8, ensure 140 psig is maintained on nitrogen supply output gage.

8. Slowly open VENT PRESS. valve (H) until the equivalent of 50 lpm flow is indicated VENT FLOW Manometer (3).

9. Record reading from N_2 INPUT PRESS. gage (27) on Performance Test Sheet. Nitrogen supply outlet gage and N_2 INPUT PRESS. gage (27) shall not differ more than 20 psig. Close VENT PRESS. valve (H).

10. Back out (counterclockwise) on Nitrogen Regulator Model 8-250 until spring tension is released. Open VENT PRESS. valve (H) until no pressure is indicated on N_2 INPUT PRESS. gage (28) and nitrogen regulator supply gage. Close VENT PRESS. valve (H).

11. Disconnect manifold C1 port from N_2 INPUT connection (18).

12. Uncap manifold C2 port and cap manifold C1 port. Connect manifold C2 port to N_2 INPUT connection (18). Position manifold assembly in altitude chamber.

13. Repeat steps 7 through 10.

14. Disconnect manifold C2 port from N_2 INPUT connection.

15. Uncap manifold C3 port and cap manifold C2 port. Connect manifold C3 port to N_2 INPUT connection (18). Position manifold assembly in altitude chamber.

16. Repeat steps 7 through 10.

17. Disconnect manifold C3 port from N_2 INPUT connection (18).

18. Uncap manifold outlet port and cap manifold C3 port. Connect manifold outlet to N_2 INPUT connection (18).

19. Repeat steps 7 through 10.

20. Close nitrogen supply cylinder.

21. Disconnect manifold assembly from N_2 INPUT connection (18) in altitude chamber and nitrogen supply cylinder.

22. Secure all test stand valves (turn all test stand valves fully to the right and back out (counterclock wise) on LOW PRESS. regulator (N) until spring tension is released and turn HIGH PRESS. regulator (Q) to VENT position.

23. Uncap manifold assembly C1, C2, and C3 ports.

24. If manifold assembly failed Check Valve and Outlet Flow Test, refer to troubleshooting (table 10-5). Proceed to Oxygen Purge (paragraph 10-30).

10-30. OXYGEN PURGE.

10-31. To perform the Oxygen Purge, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Aviator's Breathing Oxygen, Type 1	MIL-O-27210

WARNING

Do not use oxygen test stand for performing oxygen purge.

1. Connect manifold assembly filler port to regulated high pressure oxygen source.

2. Purge manifold assembly with 200 psig flow of oxygen for 3 minutes.

3. Secure high pressure oxygen source and disconnect manifold assembly.

Table 10-5. Troubleshooting (Check Valve and Outlet Flow Test)

Trouble	Probable Cause	Remedy
Pressure drop between two gages exceeds 20 psig.	Filler, C1, C2, C3, or Outlet Adapter Fitting (1) blocked.	Clean Adapter fitting (1).
	Poppet (5) in inner body (6) or lower body (8), dirty or damaged.	Clean or replace poppets (5).
	Blocked or damaged port in upper body (4), inner body (6), or lower body (8).	Clean or replace upper body (4), inner body (6), or lower body (8).
Notes: 1. Unless otherwise noted, index numbers in parentheses refer to figure 10-6.		

10-32. DISASSEMBLY.

10-33. To disassemble the high pressure oxygen manifold and check valve assembly, use index numbers assigned to figure 10-6 unless otherwise noted. The manifold and check valve assembly must be completely disassembled each time a repair action is required to ensure the assembly is free of dirt, grease and other hydrocarbons. Disassemble the manifold and check valve assembly as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Cloth	—
As Required	Material, Rubber	—

CAUTION

All disassembly, inspection, repair and assembly must be done on benches having good lighting and in an area provided with air conditioning. Walls, floor and ceiling should have a smooth finish and should be painted with a non chalking paint which can be kept clean and dust free. If manifold assembly is not going to be reassembled immediately after inspection and cleaning, stow all component parts in a plastic bag to protect them form dirt and moisture.

NOTE

Discard all O-rings, anti-sieze tape, safety wire, and lead seals removed during disassembly. No special tools are required to disassemble manifold and check valve assembly.

1. Remove adapter/nipple fittings (1) from filler, outlet, C1, C2, and C3 ports.

CAUTION

When performing step 2, wrap two flat surfaces on filler and outlet port sides of lower body (8) with a material such as cloth or rubber to protect lower body from damage when installing in vise (figure 10-5).

2. Carefully position lower body (8) into vise with two flat surfaces on bottom sides of lower body, mating jaws of vise with inner body (6). C1, C2, and C3 arrows are pointing up.

3. Using wire cutters, carefully cut and remove safety wire from four bolts (2). Discard safety wire.

4. Loosen, but do not completely remove four bolts (2).

5. Remove high pressure oxygen manifold and check valve assembly from vise.

6. Remove four bolts (2) from manifold and check valve assembly. Separate upper body (4), inner body (6), and lower body (8).

7. Remove and discard three O-ring packing (3) from upper body (4) and three O-ring packing from inner body (6).

8. Remove three poppet assemblies (5) from inner body (6) and three poppet assemblies (5) from lower body (8).

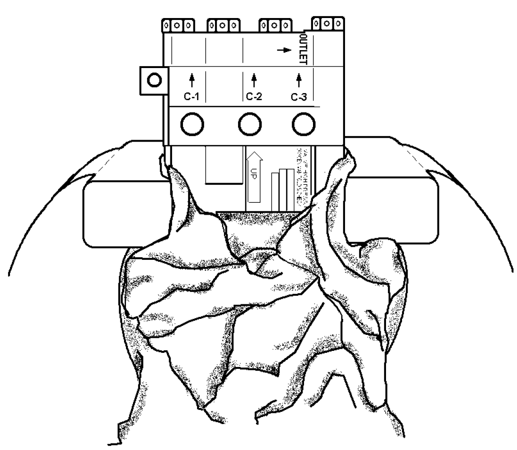


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Figure 10-5. Installing Manifold and Check Valve Assembly in Vise

10-34. CLEANING.

10-35. To clean manifold and check valve assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Distilled Water	NIIN 00-356-4936
As Required	Soap, Liquid, Ivory Dishwashing or Equivalent	Local Purchase
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

NOTE

If your command has not received the materials and special equipment required to perform the new oxygen cleaning procedures outlined in Chapter 4, utilize Cleaning of Oxygen Lines paragraph for cleaning of metal parts of manifold and check valve with the exception of poppet assemblies. Clean poppet assemblies with a mild soap and water solution (such as Ivory Liquid), rinse with distilled water and blow dry with water pumped nitrogen.

1. Clean all metal parts using procedures outlined in Chapter 4.

2. Clean all O-ring packing, using distilled water and blow dry with clean, oil free water pumped nitrogen.

10-36. INSPECTION.

10-37. Visually inspect all component parts for defects as follows:

1. Inspect poppet assemblies (5) for burrs, cracks, distortion, damaged rubber seats, and other obvious damage. Replace all defective poppet assemblies.

2. Inspect upper body (4) for damaged threads, corrosion pits, scarred or damaged interior ports, damaged mating surface, and any other obvious damage. Replace if upper body assembly is defective.

3. Inspect inner body (6) poppet seating surfaces for corrosion pits, scarred or damaged interior ports, damaged mating surfaces, damaged threads, and any other obvious damage. Replace if inner body assembly is defective.

4. Inspect lower body (8) poppet seating surfaces for corrosion pits, scarred or damaged interior ports, damaged mating surfaces, damaged helicoil inserts, damaged threads, and any other obvious damage. Replace if lower body assembly is defective.

10-38. LUBRICATION.

10-39. Lubricate O-ring packing with a light film of Krytox 240 AC or equivalent.

10-40. ASSEMBLY.

10-41. To assemble manifold and check valve assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Krytox 240 AC Lubricant	NIIN 00-961-8995 (CAGE 73925)
As Required	Lockwire	MS20995C20
As Required	Tape, Anti-seize	MIL-T-27730A, NIIN 00-889-3535 (CAGE 81349)

Support Equipment Required

Quantity	Description	Reference Number
As Required	Wrench, Torque, 300 in-lb	TE25A (CAGE 55719) NIIN 00-776-1841

NOTE

Index numbers in parentheses refer to figure 10-6 unless otherwise noted.

1. Carefully insert three poppet assemblies (5) into top ports of lower body (8).

2. Install three O-ring packing (3) into cavities on bottom side of inner body (6).

3. Position inner body (6) onto lower body (8).

4. Carefully insert three poppets (5) into top ports of inner body (6).

5. Install three O-ring packing (3) into cavities on bottom side of upper body (4).

6. Position upper body (4) onto inner body (6) and lower body (8).

7. Insert four bolts (2) into upper body (4), inner body (6) and lower body (8) and cross check tighten four bolts (2) evenly until the three bodies mate together. Place manifold assembly in vise (figure 10-5).

8. Sequentially torque four bolts (2) to 60 in-lb, then to 100 in-lb and finally, 150 in-lb. Safety wire four bolts (2).

9. Wrap pipe threads of 5 fittings (1) with two turns of antisieze tape.

10. Install 1 each of fitting (1) into filler port, outlet port, C1, C2, and C3 ports. Tighten all fittings hand tight, then using a wrench, tighten an additional one to two turns maximum. If leakage occurs when performing External Leakage Test during Bench Test, tighten fittings (1) an additional 1/2 to one full turn.

11. Perform Bench Test.

Section 10-5. Illustrated Parts Breakdown

10-42. GENERAL.

10-43. This section lists and illustrates the assemblies and detail parts of the High Pressure Oxygen Manifold Check Valve Assembly (P/Ns 2140, 2150, and 2170), manufactured by Carleton Technologies, Inc.

10-44. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

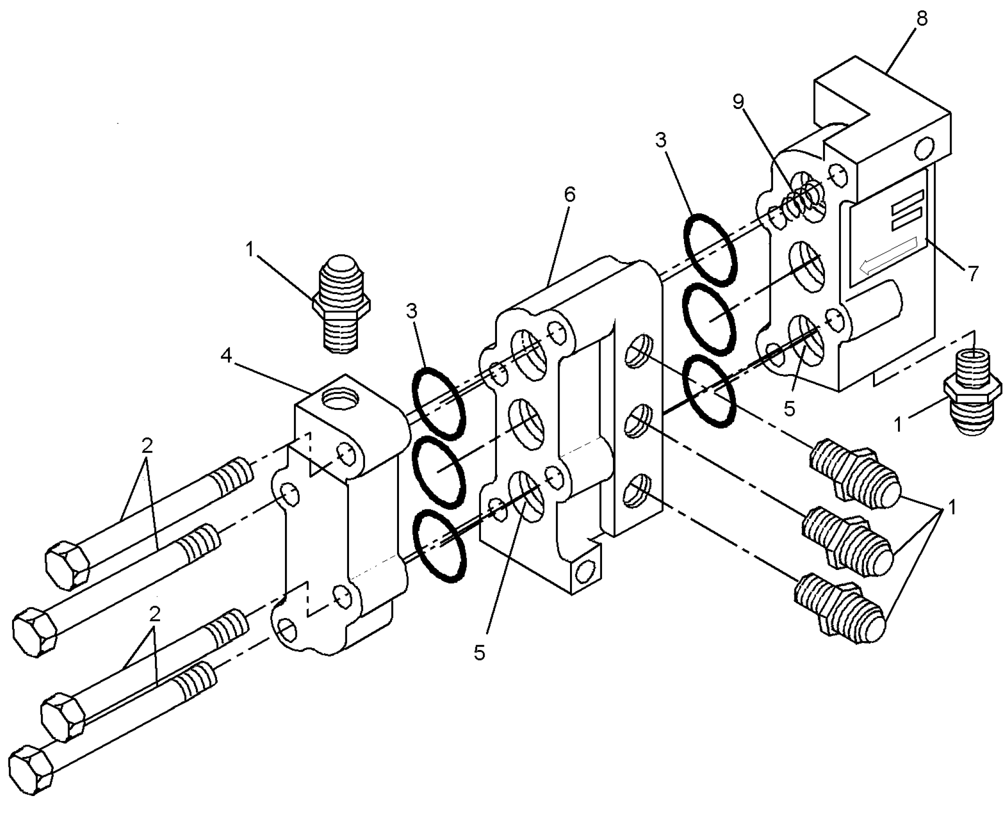

Figure 10-6. High Pressure Oxygen Manifold and Check Valve Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
10-6	2170	VALVE ASSEMBLY, High Pressure . . . . Oxygen Manifold and Check (With Flareless Adapters ER816-5J or Equivalent) (31441) (Lockheed Spec Cont DWG 654229-101)	1	A
	2150	VALVE ASSEMBLY, High Pressure . . . . Oxygen Manifold and Check (With Flared Adapters AN816-5K or Equivalent) (31441) (Lockheed Spec Cont DWG 654229-1)	1	B
	2140	VALVE ASSEMBLY, High Pressure . . . . Oxygen Manifold and Check (Without Adapters) (31441) (Lockheed Spec Cont DWG 654229-3)	1	C
-1	ER816-5J	. NIPPLE	5	A
	2159	. ADAPTER	5	A
	AN816-5K	. ADAPTER	5	B
-2	MS20074-04-22	. BOLT	4	
-3	MS9068-015	. PACKING	6	
-4	2152-1	. BODY, Upper (31441)	1	
-5	2155-1	. POPPET ASSEMBLY (31441)	6	
-6	2153-1	. BODY, Inner (31441)	1	
-7	2158-1	. PLATE, Identification (31441)	1	
-8	2154-1	. BODY ASSEMBLY, Lower (31441)	1	
-9	2157-1	. . INSERT, Helicoil, 3585-4CN x 318 (31441) . .	1	

NUMERICAL INDEX

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CHAPTER 11

QUICK-DONNING OXYGEN MASK ASSEMBLY WITH ANTI-SMOKE GOGGLES P/N 358-1506V AND 358-1506V-1

Section 11-1. Description

11-1. GENERAL.

11-2. This chapter contains maintenance and test procedures for the Quick-Donning Oxygen Mask Assemblies part no. 358-1506V and 358-1506V-1 with Anti-Smoke Goggles part no. 322-70 (manufactured by Scott Aviation Co. CAGE 92114) (figure 11-1).

11-3. The Oxygen Mask Assembly consists of a hanging suspension holder, a suspension assembly, an oxygen mask assembly, a cable and plug assembly and a dust cover. The oxygen mask assembly and anti-smoke goggles are supplied in one size (regular).

11-4. CONFIGURATION.

11-5. The single configuration of the Quick-Donning Oxygen Mask Assembly consists of a hanging suspension holder which is mounted in the aircraft to facilitate stowage, a suspension assembly which incorporates a bracket assembly, cushions, straps, retention assemblies, and yoke assembly (the electrical switching mechanism is located in the yoke assembly), an oxygen mask assembly which is of a hard shell and molded rubber construction that incorporates the microphone, valve assembly, cord and snap assembly, connector, hose, cable guides, and clamps, and a cable and plug assembly. The mask assembly comes equipped with anti-smoke goggles.

11-6. FUNCTION.

11-7. The Quick-Donning Oxygen Mask Assembly permits the aircrewmember to breathe gaseous oxygen. Oxygen supply enters the facepiece through the valve located at the bottom of the mask. Exhaled air passes out through the same valve. The exhalation portion of the valve is constructed so that only a pressure of one millimeter of mercury greater than the inlet pressure being supplied by the regulator, will force open the valve and allow exhaled air to flow from the mask. The mask also provides automatic electrical switching from the headset microphone to the oxygen mask microphone. This feature permits the aircrewmember while wearing the mask to transmit the same as with the headset microphone, without the need to unplug the headset microphone and then plug in the oxygen mask microphone.

11-8. DONNING PROCEDURES.

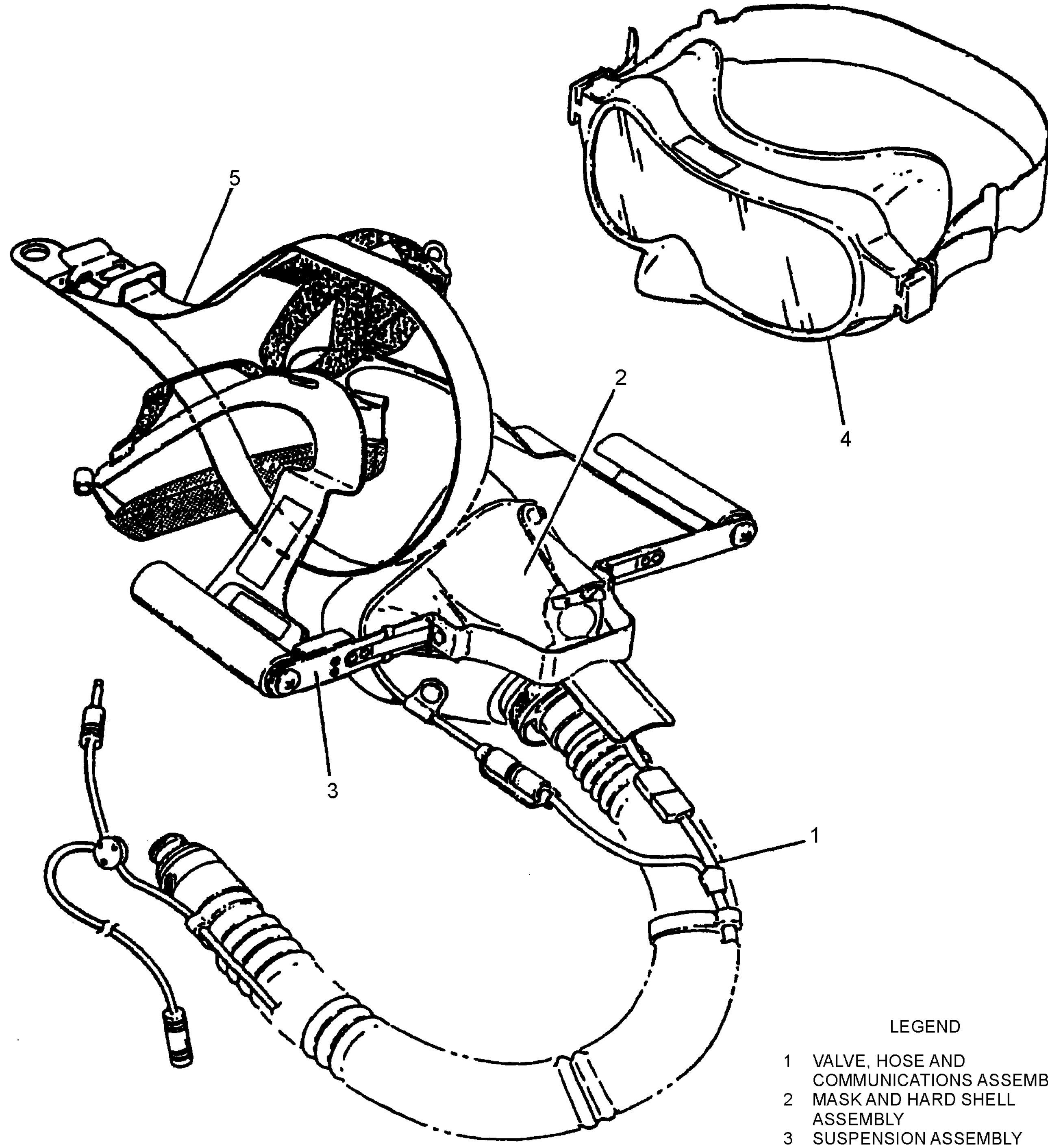
11-9. The Oxygen Mask Assembly Quick-Donning feature permits extremely rapid removal from stowage and donning with one hand in the event of an emergency. Remove the mask assembly from the suspension holder by firmly grasping the mask assembly. With the hand placed around the yoke tab, pull down and away from the hanging suspension holder. Place the mask assembly over the head until the nape pad of the suspension assembly contacts the base of the skull (figure 11-2). Pull mask assembly forward and down, causing automatic unfolding of the suspension assembly, until it rests comfortably on the face (figure 11-2). Microphone switching is automatically accomplished when the mask is unfolded. Adjust suspension assembly in accordance with paragraph 11-10. After suspension assembly is properly adjusted, don the anti-smoke goggle (figure 11-2, sheet 2). To vent the goggle, pull vent valve as shown in figure 11-2, sheet 2.

11-10. SUSPENSION ASSEMBLY ADJUSTMENT.

11-11. To adjust the suspension assembly, proceed as follows:

1. If the suspension assembly is too loose, tighten top adjustment strap until proper fit is obtained.

2. If the suspension assembly is too tight, loosen top adjustment strap assembly until proper fit is obtained.



LEGEND

1 VALVE, HOSE AND COMMUNICATIONS ASSEMBLY
2 MASK AND HARD SHELL ASSEMBLY
3 SUSPENSION ASSEMBLY
4 GOGGLE ASSEMBLY
5 HOLDING STRAP

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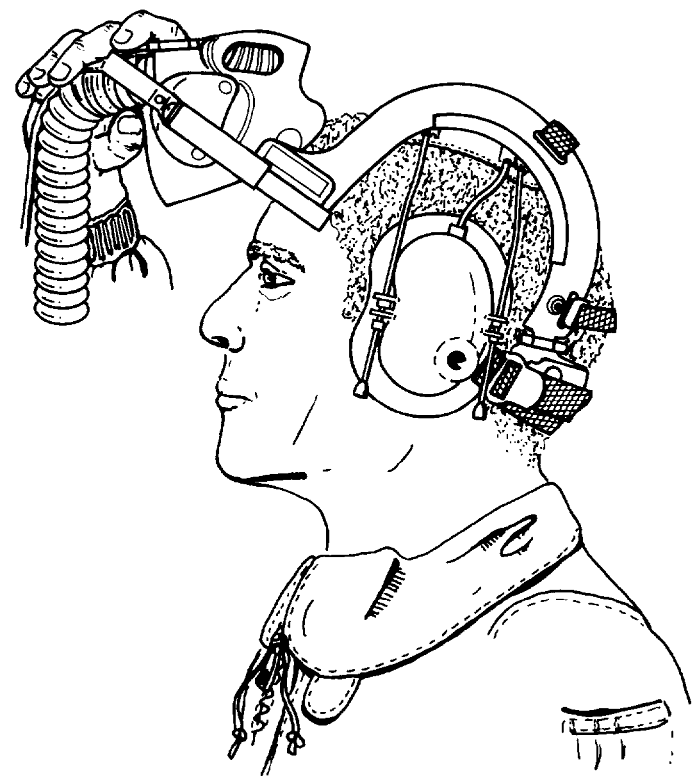
Figure 11-1. Folding, Quick-Donning Oxygen Mask and Goggle Assemblies



STEP 1. STARTING POSITION

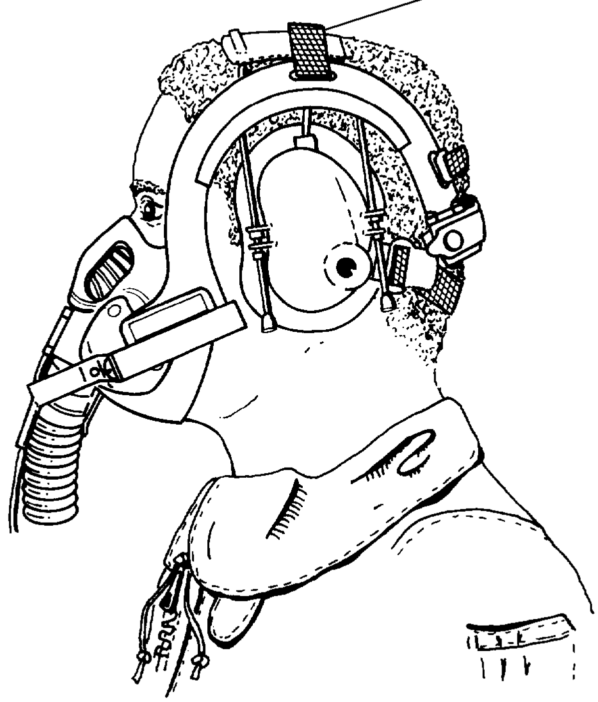


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Figure 11-2. Donning Procedure (Sheet 1 of 2)

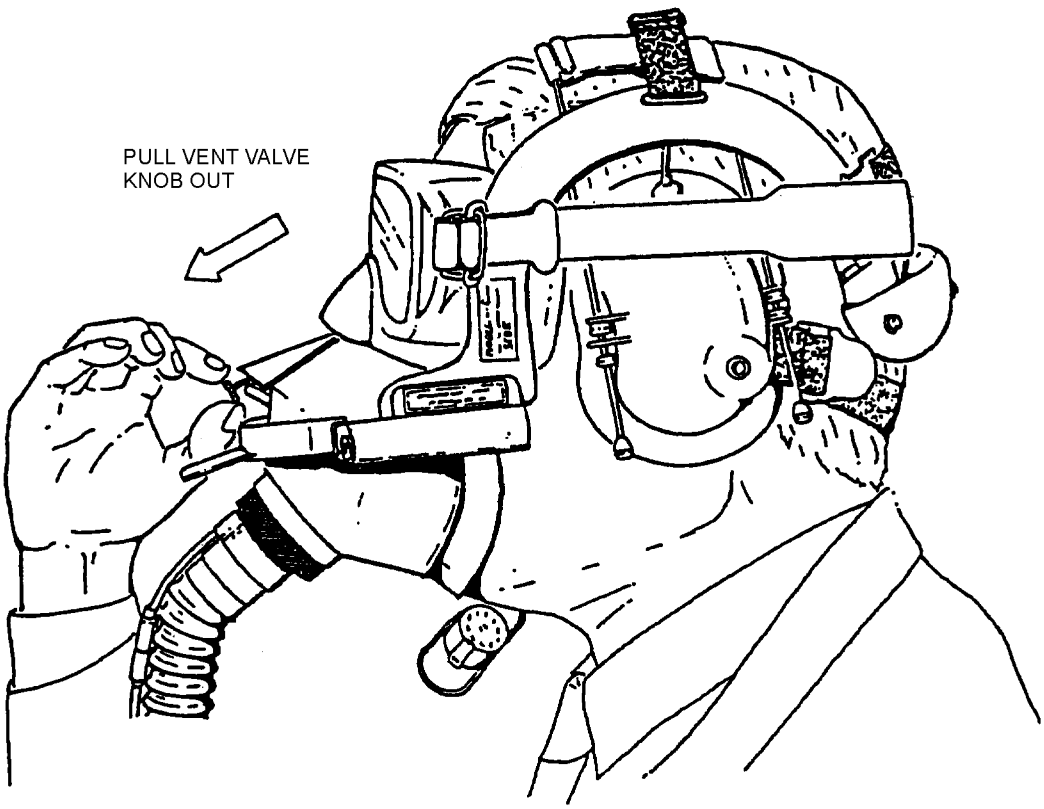


Figure 11-2. Donning Procedure (Sheet 2)

11-12. SERVICE LIFE.

11-13. Service life for the Quick-Donning Oxygen Mask Assembly, as established by the cognizant engineering activity, is indefinite. The mask is considered serviceable if it meets periodic inspection requirements.

Section 11-2. Modifications

11-14. GENERAL.

11-15. No modifications are required or authorized for the Quick-Donning Oxygen Mask Assembly.

Section 11-3. Maintenance

11-16. GENERAL.

11-17. This section contains procedural steps for disassembly, cleaning, inspection, assembly, functional testing, sanitizing and stowage. All work shall be performed in a clean, dust-free area.

NOTE

Upon completion of any maintenance action (e.g., inspection, repair, modification, etc.) be sure to complete the required Maintenance Data Collection System Forms.

11-18. INSPECTION.

11-19. PREFLIGHT INSPECTION. The Preflight Inspection consists of a Visual Inspection and Functional Test performed before each flight by the aircrewmember by whom the mask is to be used. Perform the inspection as follows:

1. Examine mask and hose for deterioration, abrasion, cracks, cuts, and security of attachment of mask-to-hose.

2. Inspect bracket and pad assembly for dents, bends, corrosion, deterioration and fraying of adjustment strap, and other obvious damage.

3. Inspect headset and microphone for cracks, damaged wiring, corrosion, and other obvious damage.

4. Examine cleanliness of entire mask assembly.

5. Inspect goggle assembly for good condition.

NOTE

If malfunctions are found or suspected, return mask assembly to aviator's equipment branch for corrective action.

11-20. ACCEPTANCE/SPECIAL INSPECTION. The Acceptance/Special Inspection consists of a Visual Inspection followed by a Functional Test. This inspection and test shall be performed in conjunction with the aircraft inspection requirements for the aircraft in which the mask assembly is installed. To perform the inspection, proceed as follows:

1. Visually inspect the mask assembly in accordance with paragraph 11-22.

2. Functionally test the mask assembly in accordance with paragraph 11-24.

3. Sanitize the mask in accordance with paragraph 11-29.

11-21. CALENDAR/PHASE/SDLM INSPECTION. A Calendar/Phase/SDLM inspection shall be performed upon issue and in accordance with the Planned Maintenance System (PMS) of the aircraft (see PMS publications for specific interval). The Calendar/Phase/SDLM Inspection consists of the following:

1. Disassembly (paragraph 11-25).

2. Cleaning (paragraph 11-28).

3. Visual Inspection (paragraph 11-22).

4. Assembly (paragraph 11-30).

5. Functional Test (paragraph 11-24).

6. Sanitizing (paragraph 11-29).

7. Storage (paragraph 11-33).

11-22. VISUAL INSPECTION. To visually inspect the Quick-Donning Oxygen Mask Assembly, examine the following:

NOTE

Repair of the Quick-Donning Oxygen Mask Assembly shall be limited to parts replacement. Any hole or tear that occurs in any component is basis for rejection of that component.

1. Mask for deterioration; material imperfections embedded foreign matter; dirty, rough, misaligned, cracked, nicked or otherwise flawed surface; any component loose or not properly attached. Replace defective components or mask assembly.

2. Exhalation/inhalation valve for nicks, grooves, scratches, or any other damage affecting sealing action. If valve is defective, replace the valve.

3. Headstraps/suspension assembly for fraying, deterioration, or cuts. Hardware for corrosion or other damage. Replace defective components.

4. Delivery hose for deterioration, cuts, abrasion creased or flat spots. Replace defective hose.

5. Communications cable/microphone for electrical continuity and proper operation. Replace defective components.

6. Visually inspect the goggle frame and strap for tears or cuts and the lens for cracks or excessive scratches. Replace any defective components.

7. Apply anti-fog solution, NSN 6850-00-754-2672, to the inside of goggle lens.

11-23. TESTING.

11-24. FUNCTIONAL TEST. To test the mask after inspection, proceed as follows:

1. Plug inlet end of connector assembly by any suitable method.

2. Holding mask close to face, but not sealed to face, inhale deeply. Then press mask firmly to face, forming a tight seal, and exhale forcibly. If the exhalation valve is operating properly, the exhalation will be smooth with minimum resistance.

3. Affix mask assembly to face, adjusting straps for a snug, comfortable, leak-tight fit. With inlet end of hose assembly blocked, inhale sharply and deeply and hold inhalation (keep inhaling) as long as possible. If there is no leakage through mask hose, fittings, or exhalation valve, and as soon as all residual air in mask and hose has been inhaled, further inhalation will be impossible.

4. Obtain assistance from Avionics Branch to ensure proper continuity of communications leads.

11-25. DISASSEMBLY.

11-26. To disassemble the Quick-Donning Oxygen Mask Assembly, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Pliers, Hose Clamp	450-813
1	Elastrator	00-6297
1	Valve Wrench, Nut	358-185
1	Torque Wrench (30 to 150 in-lb)	25D150F or equivalent

CAUTION

All inspection and maintenance shall be performed in an area free from dirt, metal or plastic chips or other forms of contamination.

NOTE

Index numbers refer to figure 11-6 unless otherwise noted.

Disassemble the Quick-Donning Oxygen Mask Assembly only to the extent necessary to repair or clean the mask assembly.

1. Remove retainer clip (67) disconnect the microswitch cable (61) from the oxygen hose communication cable (8). This connection is located between the upper cable strain relief and the pull-the-dot fastener.

2. Disassemble the valve, hose and communication assembly (3) from the hardshell and facepiece subassembly (25) by pushing in and rotating the valve assembly (5) counterclockwise to disengage the bayonet pins from the valve housing.

3. Unsnap the pull-the-dot fastener located on the microswitch (61) from the hardshell and facepiece subassembly (25).

4. Hold suspension assembly (40) in both hands with thumbs pressing on the spring retainers. Depress spring retainers until they disengage the hardshell pivots (34). To release the hardshell and facepiece assembly, pull the yoke assembly (59) apart slightly.

5. Do not remove label (57) and nameplate (58) unless damaged or illegible.

6. Open strap retainers and remove rear strap assembly (52); unbuckle and remove top strap assembly (51); remove nape pad cover (50) and nape (49) from bracket (56).

NOTE

Screws (46) were installed with Loctite. Carefully remove screws to avoid damage to inner slides.

7. Extend retention assembly (41 or 42) and hold inner slide firmly while removing screws (46) and washers (47). Remove yoke (60) retention cover (44 or 45) and spacer (48).

8. Using wrench (358-185), remove retaining ring nut (27). Lift the hardshell and facepiece subassembly from the holding fixture and remove gasket (27), washer (29), ring (30), sleeve (31), and shield (32).

NOTE

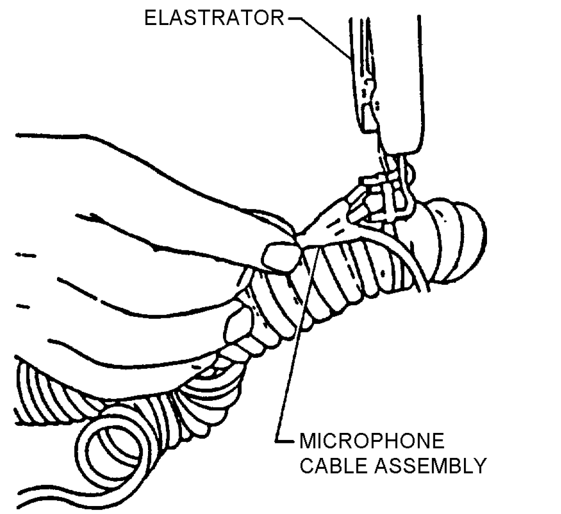
Vent valve must be in the open position before removal.

9. Remove vent valve rod from its inner sleeve by unscrewing the rod and pulling it out. Remove the vent valve and facepiece as a unit from the hardshell.

10. Disconnect the communication cable (8) from the cable and plug assembly (5) by pressing the red release pin on the U-179/U connector.

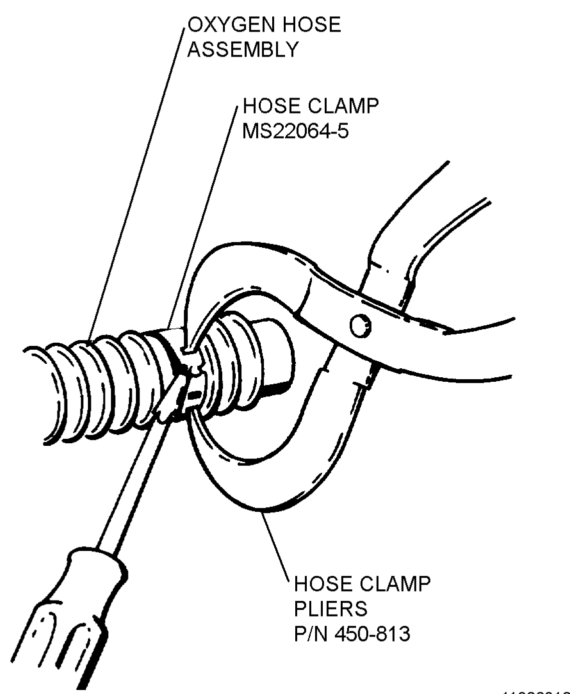
NOTE

If using valve adapter P/N G001-3001-01. There will only be one (18) and four (23) cable guides installed. See figure 11-6.



Step 11 - Para 11-26

11. Using elastrator, remove two cable guides (18) and five cable guides (23) from the oxygen hose (4) and communications cable (8). Gently pull down upper cable guide (18) to expose upper hose clamp or strap fastener as applicable.



Step 12 - Para 11-26

12. Using the hose clamp pliers, remove the two clamps (19). MAJCOM option strap fastener (NSN 5975-00-285-5742) or equivalent may be used in place of hose clamp. If strap fastener is to be installed, place strap end through locking block and take up slack. Position strap into place and snug down tight. Cut strap end flush with locking block. To remove strap fasteners, carefully cut the locking block with a common pair of wire cutters or dikes.

NOTE

If the snap hook was removed from the cord and snap assembly (22), remove cord by using a 3/32 inch punch drive to remove the roll pin from the disconnect fitting (6).

13. Unhook snap end of cord and snap assembly (22) from roll pin and remove oxygen valve microphone assembly and fitting (5) from the oxygen mask (4).

14. Loosen four screws (12) on the microphone retainer assembly (10) and remove the communication wires and microphone bracket assembly (9).

15. Remove the two screws (14) holding the microphone (13) to the bracket (9).

16. Remove the two screws (11) from the microphone retainer assembly (10) and remove the microphone retainer assembly from the oxygen valve (5).

NOTE

If valve adapter assembly P/N G001-3001-01 is used, refer to figure 11-7 when performing steps 17 thru 20.

17. Loosen three set screws (2) from valve adapter (1), must extend at least 1/16 inch out of adapter.

18. Unthread combination valve from valve adapter (1).

19. Remove O-ring (3) from valve adapter (1).

20. Loosen set screws (10), remove microphone assembly.

NOTE

To disassemble anti-smoke goggle assembly, steps 21 thru 23, refer to figure 11-8.

21. Remove the headstrap (4) from the buckle assemblies (3).

22. Remove the buckle assemblies from the frame (1).

23. Carefully remove the lens (2) from the frame (1).

NOTE

To disassemble and replace cable and plug assembly (12, figure 11-7), steps 24 thru 28, see figure 11-7.

24. Loosen set screws (10) and remove communication wires from left and right block brass (7, 8).

25. Remove screws (19) from body assy (1), and slide cable and plug assembly (12) from body assembly.

26. Remove O-ring (16), and plate assembly (18) from old plug assembly (12) and install on replacement cable and plug assembly (12).

27. Slide cable and plug assembly (12) through body assembly (1) and attach strain relief assembly (15) to cable (12), then install and tighten screws (19).

28. Connect wires from cable and plug assembly (12), black wire to left block brass (7), white wire to right block brass (8). Tighten set screws (10).

11-27. CLEANING AND SANITIZING.

11-28. CLEANING. Masks not on a personal issue basis shall be cleaned after each use and during the Calendar/Phase Inspection. To clean mask, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Benzalkonium Chloride Solution	MIL-B-37451
As Required	Cloth, Lint-Free, Type II	MIL-C-85043
As Required	Cotton Swabs	—
As Required	Detergent, General Purpose Type I	MIL-D-16791
	or	
As Required	Soap, Laundry Low-filter	P-S-600
As Required	Isopropyl Alcohol	TT-A-735A

Support Equipment Required

Quantity	Description	Reference Number
1	Brush, Soft Bristle	—

NOTE

The detergent solution is preferred since there is no risk of contamination due to undissolved soap powder residue.

1. DETERGENT SOLUTION. Make a 1-percent by weight solution of cleaning compound (Detergent, General Purpose) by adding 1/4 to 1/2 ounce (liquid) of the compound to one gallon of water.

NOTE

If it is necessary that the soap powder solution be used, agitate solution and use only the lather to clean the mask.

2. SOAP POWDER SOLUTION. Make a suitable soap solution by adding approximately 4 tablespoons of soap powder to one gallon of water. Hardness of water may require more soap but the solution must be sufficiently strong to readily form lather when agitated. Make sure that all soap particles are dissolved.

WARNING

Do not use alcohol in any form to clean masks. Do not use any flammable solvents or liquid toxicants for cleaning.

3. Using a soft bristle brush, apply cleaning solution to mask and oxygen hose. After application of cleaning solution to mask and delivery hose, submerge entire mask and delivery hose in cleaning solution and agitate thoroughly. Rinse in clean, potable cold water and shake off excess.

4. Clean all O-rings and rubber gaskets using same procedures in step 3.

5. To clean the inhalation/exhalation oxygen valve, proceed as follows:

CAUTION

The inhalation/exhalation valve must be removed from mask before cleaning. Isopropyl alcohol must not come in contact with the oxygen mask.

a. Obtain a small container large enough to partially submerge the oxygen valve.

NOTE

If a 70% solution of isopropyl alcohol is not available, mix 3 parts water and 7 parts isopropyl alcohol.

b. Fill container half full with benzalkonium chloride solution or a 70% solution of isopropyl alcohol.

CAUTION

Do not submerge the oxygen valve in water. Do not probe any portion of the valve.

c. Hold base portion of valve; submerge in partially filled container, and wash operating portion of valve in alcohol solution. Normally only a few seconds are required to remove stains and residue.

d. Use a cotton swab saturated in benzalkonium chloride solution or isopropyl alcohol to remove stubborn residue. LIGHTLY rub only exhalation plate.

e. Gently shake excess solution from oxygen valve and allow to air-dry completely.

NOTE

Trapped isopropyl alcohol will evaporate in approximately 15 minutes.

6. To clean the microphone, proceed as follows:

a. Wipe microphone with a cotton swab or soft, clean cloth dampened lightly in cleaning solution.

b. Rinse with a second cotton swab dampened lightly in clean, potable cold water. Make sure no lint remains on microphone.

CAUTION

Do not use compressed gas for drying as valves may be damaged.

7. A dry swab can be used to assist in drying washed items. Be careful that lint is not trapped in valves or mask crevices. Air-dry in a ventilated area out of direct sunlight. The mask and delivery hose may be forced-air dried using a stream of clean, dried, oil-free air or nitrogen. Make sure that parts are completely dry before reassembling mask.

NOTE

Examine valves, mask, and hose for undissolved soap powder. Ensure that mask and valves are completely dry and lint-free.

8. Clean anti-smoke goggle assembly with a soft lint-free cloth and mild soap solution.

9. Rinse goggles in clean, potable cold water and shake off excess.

11-29. SANITIZING. Masks not on a personal issue basis shall be sanitized after each use as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Cloth, Lint-Free, Type II	MIL-C-85043
As Required	Pad, Gauze	—
As Required	Sanitizing Solution, Thimerosal	NIIN 00-128-5695
As Required	Spray SBT-12, Antiseptic, Aerosol	—

NOTE

One-quarter pint of Thimerosal, as issued, is sufficient to sanitize at least 10 masks.

1. Moisten a gauze pad with solution, squeeze to prevent dripping, and wipe interior of mask exclusive of valves and microphone. Ensure that sanitizing solution penetrates all crevices.

2. Wipe valves and microphone with a clean, dry cloth. Ensure that no lint remains in mask, on valves, or on microphone.

NOTE

If Thimerosal is not available, an alternate sanitizer, Aerosol Antiseptic Spray SBT-12 (dibromosalicyl bromanicide), manufactured by Lever Brothers, Inc., can be used. Directions for use are indicated on the container.

3. After sanitizing, place dust cover over facepiece and attach suspension strap to bracket and pad assembly (figure 11-3). If mask assembly is not to be placed in immediate service, store in accordance with paragraph 11-33.

11-30. ASSEMBLY.

Support Equipment Required

Quantity	Description	Reference Number
1	Pliers, Hose Clamp	450-813
1	Elastrator	00-6297
1	Valve Wrench, Nut	358-185
1	Torque Wrench (30 to 150 in-lb)	25D150F or equivalent

11-31. ANTI-SMOKE GOGGLE ASSEMBLY. To assemble the anti-smoke goggle assembly, proceed as follows:

NOTE

Index numbers refer to figure 11-6.

1. Install lens (2) into frame (1) ensuring tongues of lens (2) are seated into the grooves of frame (1).

2. Install two buckle assemblies (3) onto frame (1).

3. Connect headstrap (4) onto two buckle assemblies (3).

11-32. QUICK-DONNING OXYGEN MASK ASSEMBLY.

NOTE

Index numbers refer to figure 11-6 unless otherwise noted.

1. Assemble the suspension assembly (40) starting with microswitch cable (61), then the left retention assembly (41) and the right retention assembly (42) as follows:

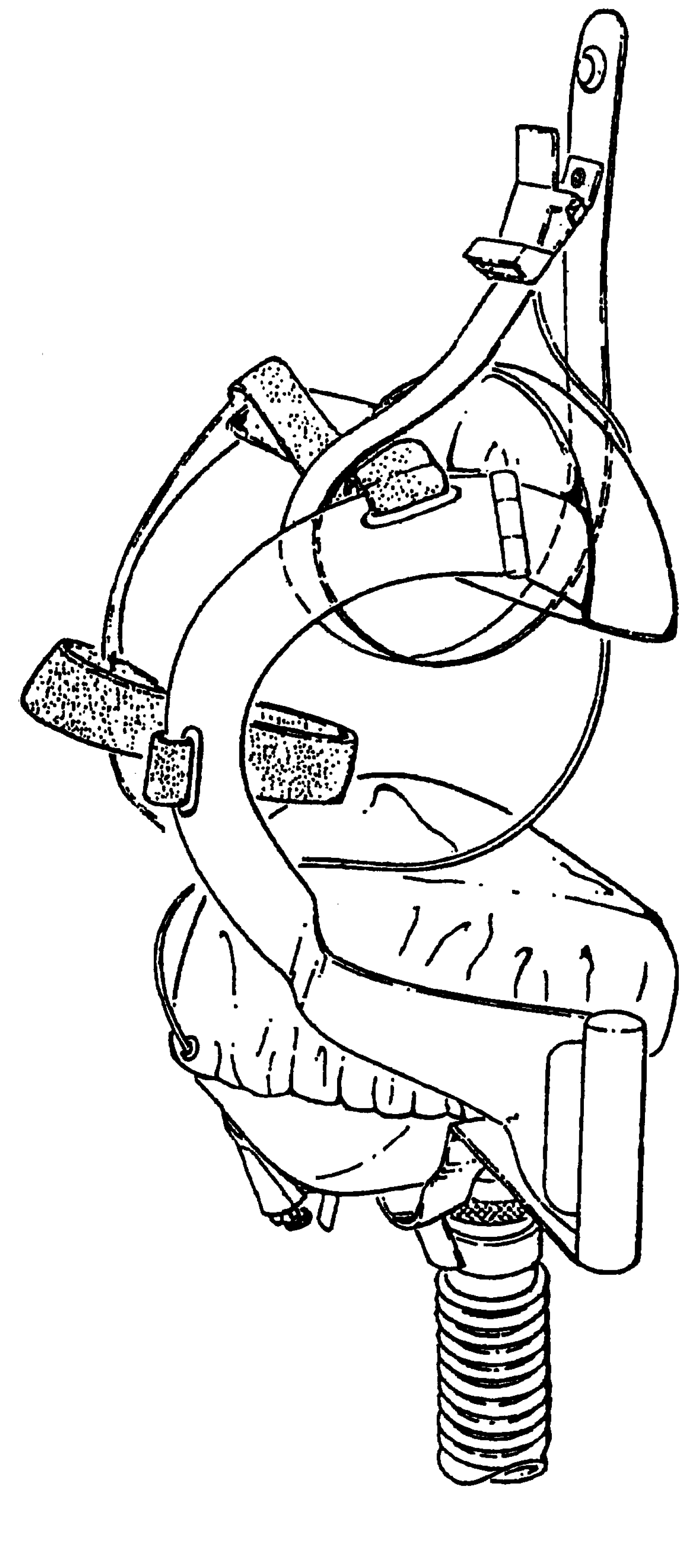


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Figure 11-3. Folding, Quick-Donning Oxygen Mask in Holder Assembly

a. Attach microswitch cable (61) to yoke (60) with screws (62) and nuts (63) through insulator (69), actuator spring (65) and switch housing (64). Secure cable in cable retainer clip (66). Apply one drop of Loctite or RTV adhesive to nuts.

NOTE

If required, attach retention assemblies (41, 42) to suspension brackets (54, 55) using screws (43).

b. Install retention spacer (48) and left retention assembly (41) into left retention cover (44).

c. Repeat step 2 for right retention assembly (42) using right retention cover (45).

d. Coat threads of screws (46) with Loctite or RTV adhesive and attach yoke (60) to retention assemblies (41, 42) with screws (46) and washer (47).

e. Install nape pad (49) and nape pad cover (50) on nape bracket (56).

f. (Optional) Attach top strap assembly (51) by placing ends through slots provided in suspension brackets (54, 55). Buckle securely. (MAJCOM Option.) Fold strap end over 3/4 inch and tack at both corners. Tack with double waxed thread, type IVB, ticket 8 to 4 or equal. Make two turns through the strap and secure the tackings with a surgeon's knot.

g. Attach rear strap assembly (52) by placing ends through slots provided in suspension brackets (54, 55) and closing strap retainer.

2. Assemble the hardshell/facepiece subassembly as follows:

a. Place facepiece (26) into hardshell assembly (33).

b. Install washer (29), gasket (28) and retaining ring nut (27) from the facepiece side.

c. Install locking shield (32), compression sleeve (31), and bayonet ring (30) from hardshell side. From the facepiece side, screw the remaining ring nut (27) onto the bayonet ring (30) until hand tight.

d. Place the hardshell/facepiece subassembly (25) into the holding fixture (358-184).

e. Using the torque wrench (358-186) extension and a suitable torque wrench, torque retaining ring nut (27) to 75 ± 10 inch-pounds.

NOTE

Do not remove facepiece from vent valve stem unless replacement is necessary. These parts are sealed at the manufacture with RTV adhesive.

f. Install vent valve body and facepiece as a unit into hardshell by inserting the vent valve body (39) into the slot on hardshell.

g. Lubricate vent valve rod using KRYTOX 240AC, MIL-G-27167, Type III or BRAYCOTE NSN 9150-00-961-8995, then install vent valve rod by inserting rod into inner sleeve on valve stem and screw hand tight.

3. Assemble the microphone onto the oxygen valve as follows:

a. Insert communication wires into the two center holes of microphone retainer assembly (10). Tighten the two center screws (12), to retain wires.

b. Install nameplate (24) using screw (21). Install microphone retainer assembly (10) using two screws (11). Install microphone (13) onto microphone bracket (9) using two screws (14). If valve adapter assembly part no. G001-3002-01 is used, proceed to steps c through i below.

NOTE

If valve adapter assembly (1, figure 11-7) is used, proceed as follows using figure 11-7.

c. Ensure three set screws (2) are backed out of valve adapter (1) at least 1/16 inch.

d. If not already accomplished, remove o-ring (3) from valve adapter (1).

e. Apply a light film of krytox, MIL-6-27617 (or suitable substitute), to o-ring (3) and reinstall into valve adapter (1).

f. Thread combination valve into valve adapter (1).

g. Tighten three set screws (2) to lock combination valve into valve adapter (1).

h. Reinstall microphone blocks (7, 8).

i. Tighten set screws (10).

4. Assemble the Valve, Hose and Communication Assembly as follows:

NOTE

Locally manufacture nylon attachment hook out of steel wire 1/16 inch in diameter for attaching nylon cord to oxygen valve (figure 11-4).

a. Attach cord end (22) of cord and snap assembly to the roll pin of valve assembly. Install upper cable guide (18) attached to U-179/U connector to oxygen hose using elastrator. Thread other end of cord and snap assembly through the oxygen hose (4) and slip oxygen hose over valve base.

NOTE

The maximum length of the anti-stretch cord is 23 1/2 inches and the minimum length 14 1/2 inches. Measure the nylon anti-stretch cord from the bottom end of the oxygen valve to the exposed end of the connector assembly. Cut off unused cord after tying knot.

Mask end of oxygen hose should slip over valve.

b. Using pliers, install clamp (19) over oxygen hose and valve.

(1) MAJCOM Option: Strap fastener (NSN 9575-00-285-5742) or equivalent may be used in place of hose clamp. If strap fastener is to be installed, place strap end through locking block and take up slack. Position strap into place and snug down tight. Cut strap end flush with locking block.

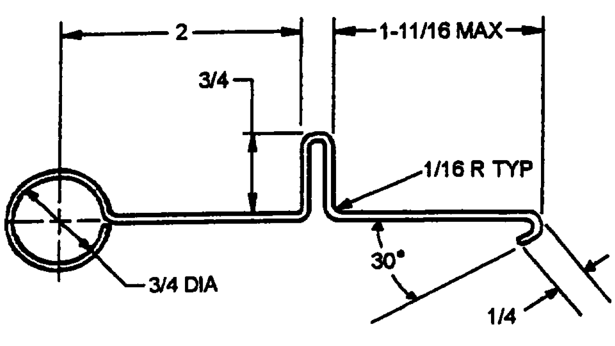

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Figure 11-4. Nylon Cord Attachment Hook

(2) MAJCOM Option: An installing tool (NSN 5120-00-781-7891) may be used to tighten and cut the excess strap. When using the installing tool set in the standard setting number to 8 and torque the strap down tight.

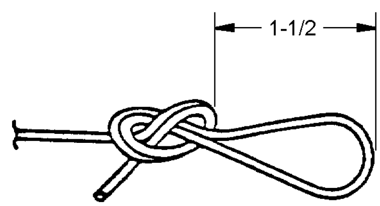
c. Attach the snap end of cord and snap assembly (22) to the roll pin of the disconnect fitting (7). Slip other end of oxygen hose (4) over disconnect fitting (7).

NOTE

OPTION: If oxygen hoses are being damaged by the snap portion of the snap and cord assembly (22), units are authorized to remove the snap and attach the cord directly to the roll pin of the disconnect fitting (7) using the following procedures.

(1) Remove snap from cord and snap assembly (22).

(2) Take nylon cord, form 1 1/2 inch loop and secure with bowline knot.



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Step 4.c.(2) - Para 11-32

(3) Form a half-hitch and attach cord (22) to disconnect fitting (7) in the same manner shown in figure 11-5.

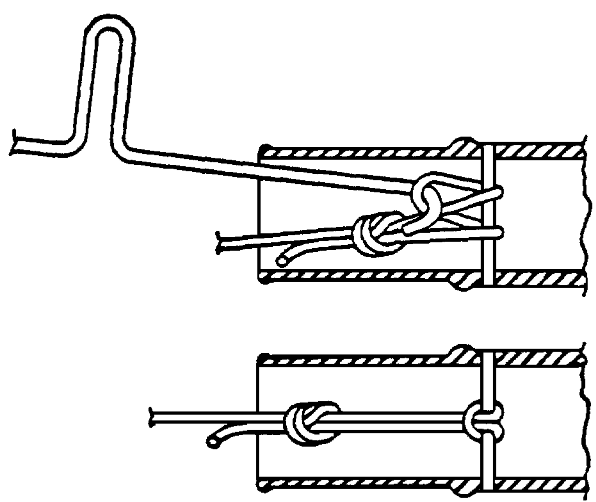

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Figure 11-5. Attachment of Cord Assembly Without Snap

d. Using pliers, install clamp (19) over oxygen hose and quick disconnect fitting.

NOTE

Refer to step 4.b.(1) and 4.b.(2) above for substitution of a strap and usage of an installing tool.

To prevent damage to the plug and cable assembly (12, figure 11-7) when using valve adapter P/N G001-1300-01. Do not install cable guides (18, 23, figure 11-6) over plug and cable assembly (12, figure 11-7).

e. Place two (2) additional cable guides, P/N 249-425 on the mask hose, one to be placed above the female connector, U-179A/U on the valve communication cord and another cable guide on the U-179/U just above the Y on the hose communication cord, to prevent the breakage of the communication cord.

f. Using elastrator, install cable guides (18, 23) over communications cable (8) and install cable guides with communications cable on oxygen hose (4).

5. Assemble the remaining components as follows:

a. Install suspension assembly (40) onto hardshell/facepiece subassembly (25). Snap the “pull-the-dot” fastener of microswitch cable assembly (61) to the hardshell.

b. Install the valve, hose and communication assembly (3) onto the bayonet receiver of the hardshell/facepiece subassembly (25). Connect the oxygen valve cable and plug assembly (5) and oxygen communication cord (8) together. Connect oxygen hose communication cable (8) and the microswitch cable (61) together. After connecting the oxygen hose communication cable (8) and microswitch cable (61) together, attach the retainer clip (67) to ensure positive connection and security.

c. Install the strain relief assembly, lower (68) as shown in figure 11-9.

11-33. STORAGE.

11-34. Masks not used on a personal-issue basis are to be sanitized before storage. Place the mask assembly in a plastic bag or any other suitable container that will keep the mask clean, dry, and lint-free. Stored masks must have ample ventilation and not be exposed to excessive heat or direct sunlight. The masks are not to be stored in an area where other flight gear will be stored on top of them.

Section 11-4. Illustrated Parts Breakdown

11-35. GENERAL.

11-36. This Section lists and illustrates the procurable parts of the Quick-Donning Oxygen Mask Assembly, Type MBU-10/P.

11-37. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

11-38. USABLE ON CODES.

Usable On	Code
358-1506V	A
358-1506V-1	B

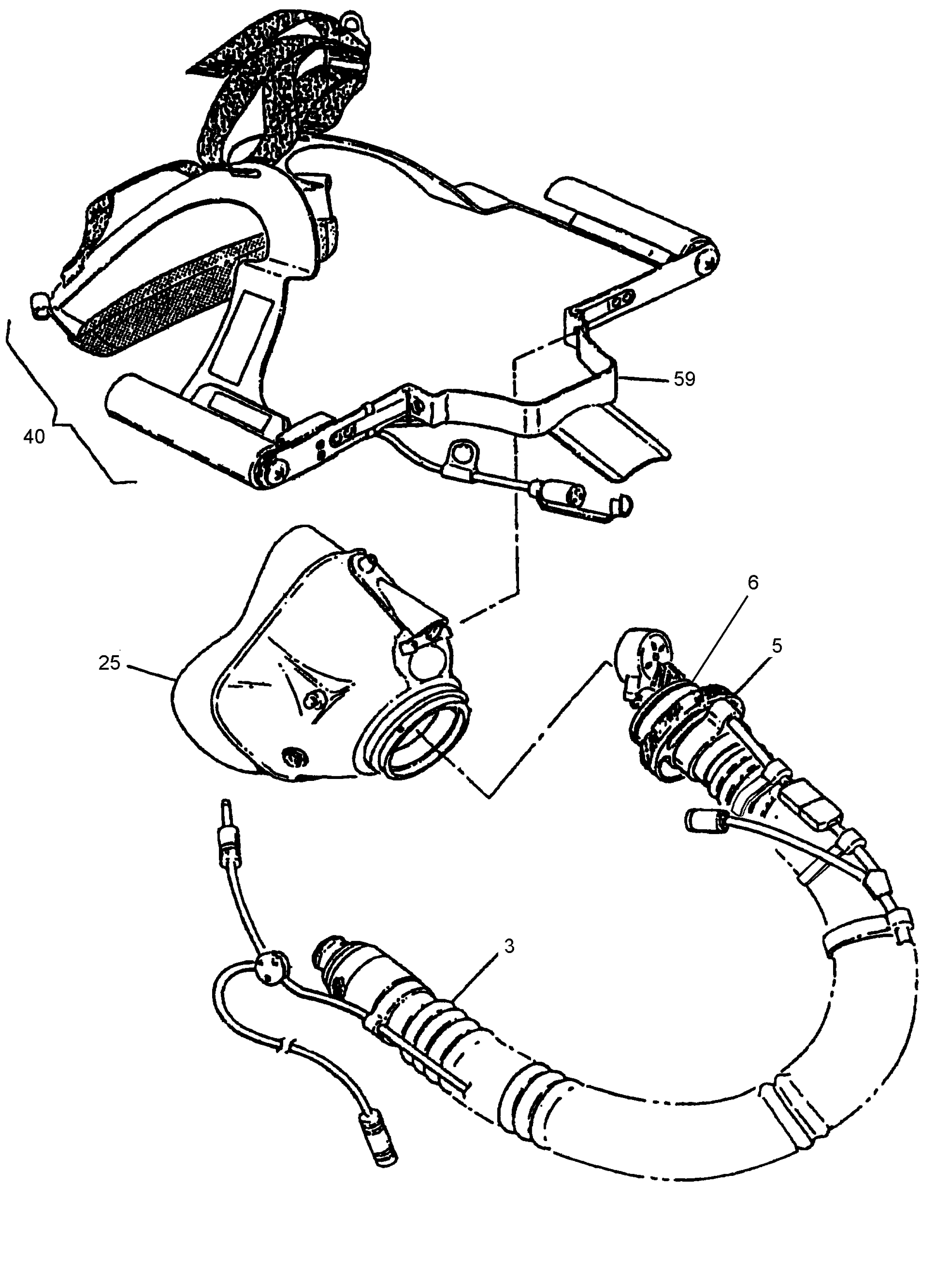

Figure 11-6. Folding, Quick-Donning Mask Assembly, Exploded View (Sheet 1 of 2)

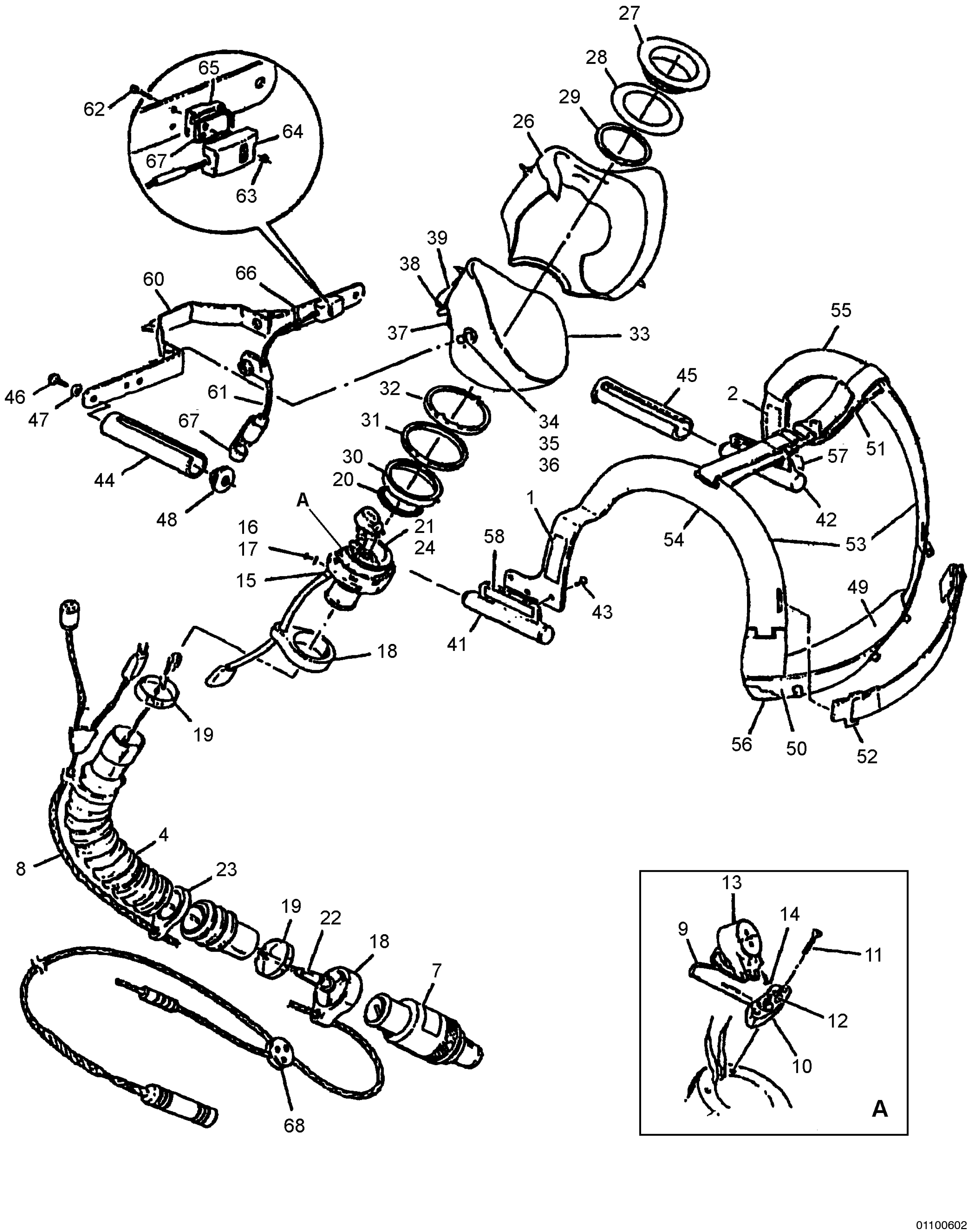

Figure 11-6. Folding, Quick-Donning Mask Assembly, Exploded View (Sheet 2)

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
11-6	358-1506V	MASK ASSY, Folding, Quick-Donning Oxygen (92114)	REF	A
	358-1506V-1	MASK ASSY, Folding, Quick-Donning Oxygen (92114)	REF	B
-1	358-1459	. NAMEPLATE (92114)	1	A
-2	358-1059	. NAMEPLATE (92114)	1	B
-3	232-1110	. VALVE, Hose and Communication Assy (92114)	1	
-4	834-18 or G012-1036-01	. . HOSE (92114)	1	
-5	232-1823* G001-3018-01	. . VALVE, Cable and Plug Assy (92114)	1	
-6	G001-3001-01	. ADAPTER ASSY (60240) (See figure 11-7 for Breakdown)	1	
-7	232-94A G002-1060-01	. . FITTING, Disconnect and Connect (92114)	1	
-8	358-1358 G030-1055-01	. . COMMUNICATIONS CABLE (92114)	1	
-9	232-1309	. . BRACKET (92114)	1	
-10	232-1292*	. . RETAINER ASSY, Microphone (92114)	1	
-11	00-2234*	. . . SCREW (AP) (92114)	2	
-12	MS16995-2* or G012-9002-01	. . . SCREW, Allen (96906)	4	
-13	00-1587 09168P-33	. . MICROPHONE, M101/A1C (92114)	1	
-14	AN500D2-5 2089288-2302	. . SCREW (AP) (88044)	2	
-15	00-1081*	. . LUG, Terminal (92114)	1	
-16	00-66*	. . SCREW (AP) (92114)	1	
-17	MS35333-35* or G012-1035-01	. . WASHER (AP) (96906)	1	
-18	00-639	. . GUIDE, Cable (92114)	2	
-19	450-134A or G012-1033-01	. . CLAMP, Cable (92114)	2	
-20	GW9729	. . O-RING (60240)	1	
-21	00-668*	. . SCREW (92114)	1	
-22	339-16 or G012-1046-01	. . CORD AND SNAP ASSY (92114)	1	
-23	249-425 or G012-1034-01	. . GUIDE, Cable (92114)	5	
-24	232-115*	. . NAMEPLATE (92114)	1	
-25	358-1223-3	. HARDSHELL AND FACEPIECE SUBASSEMBLY (92114)	1	A
	358-1223-5	. HARDSHELL AND FACEPIECE SUBASSEMBLY (92114)	1	B
-26	358-1227	. . FACEPIECE (92114)	1	
-27	358-15	. . NUT, Retaining Ring (92114)	1	
-28	358-14	. . GASKET (92114)	1	
-29	358-174	. . WASHER (92114)	1	
-30	232-203	. . RING, Bayonet (92114)	1	

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
11-6-31	232-202	. . SLEEVE, Compression (92114)	1	
-32	358-13	. . SHIELD, Locating (92114)	1	
-33	358-1224-3	. . HARDSHELL ASSY (92114)	1	
-34	358-637	. . . PIVOT (92114)	2	
-35	00-3244	. . . SCREW (AP) (92114)	2	
-36	AN960KD6	. . . WASHER (AP) (92114)	2	
-37	358-1228-3	. . NAMEPLATE (92114)	1	
-38	358-1231	. . ROD SUBASSEMBLY (92114)	1	
-39	358-1232-1	. . BODY, Vent Valve (92114)	1	
-40	358-1255-1	. SUSPENSION ASSY (92114)	1	
-41	358-613-3	. . RETENTION ASSY, Left Hand (92114)	1	
-42	358-613-4	. . RETENTION ASSY, Right Hand (92114)	1	
-43	00-5493	. . SCREW (AP) (92114)	6	
-44	358-1313	. . COVER, Retention, Left (92114)	1	
-45	358-1314	. . COVER, Retention, Right (96906)	1	
-46	AN526C1032R6	. . SCREW (96906)	2	
-47	MS35333-39	. . WASHER, Locking (96906)	2	
-48	358-1315	. . SPACER, Retention (92114)	2	
-49	358-636	. . PAD, Nape (92114)	1	
-50	358-1074	. . COVER, Nape Pad (92114)	1	
-51	358-1013	. . STRAP ASSY, Top (92114)	1	
-52	358-1015	. . STRAP ASSY, Rear (92114)	1	
-53	358-1017-2	. . BRACKET ASSY (92114)	1	
-54	358-1018-3	. . . BRACKET, Suspension, Left Hand . . . . . (Not procurable separately, order NHA) (92114)	1	
-55	358-1018-4	. . . BRACKET, Suspension, Right Hand . . . . . (Not procurable separately, order NHA) (92114)	1	
-56	358-1016	. . . BRACKET, Nape (Not procurable . . . . separately, order NHA) (92114)	1	
-57	358-1460	. . LABEL, Date Stamp (92114)	1	
-58	358-1257	. . NAMEPLATE, Left Side (92114)	1	
-59	358-1256-1	. . YOKE AND COMMUNICATION ASSY . . . . (92114)	1	
-60	358-1256-2	. . . YOKE (92114)	1	
-61	358-1355-3	. . . MICROSWITCH, Cable (92114)	1	
-62	MS35190-214	. . . . SCREW (AP) (96906)	2	
-63	MS35649-222	. . . . NUT (AP) (96906)	2	
-64	358-1309	. . . . HOUSING, Switch (92114)	1	
-65	358-1317	. . . . SPRING, Actuator (92114)	1	
-66	358-1316	. . . . CLIP, Cable Retainer (92114)	1	
-67	358-1362	. . . . RETAINER, Micro-switch . . . . Connector Plug (92114)	1	
-68	358-1352	. . STRAIN RELIEF ASSEMBLY, Lower . . . . . . (See figure 11-9 for parts breakdown) (92114)	1	
-69	00-4894-3	. . INSULATOR (72114)	1	

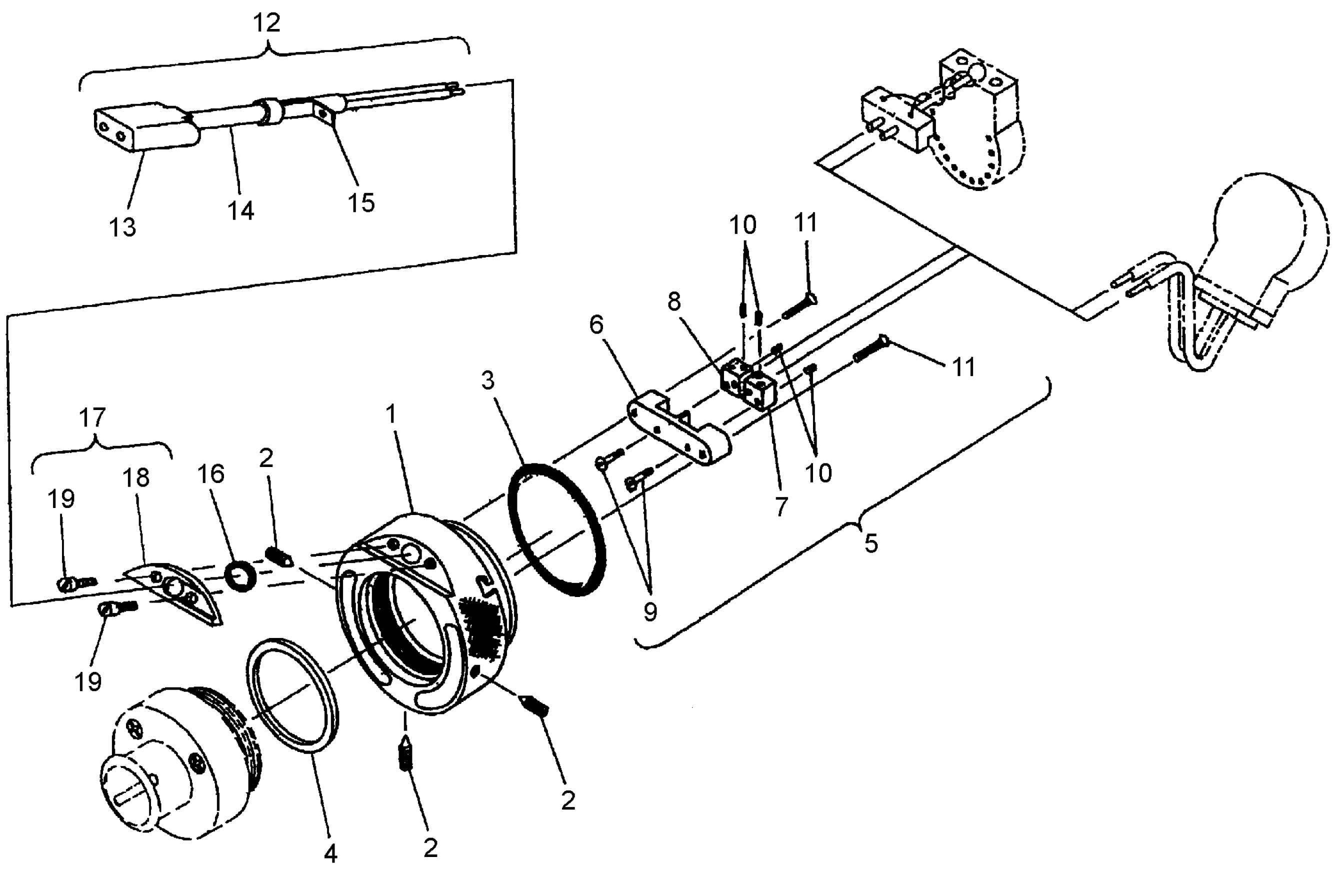

Figure 11-7. Adapter Assembly, Exploded View

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
11-7	G001-3001-01	ADAPTER ASSY, Valve Quick-Donning Oxygen Mask (60240)	REF	
	G001-5030-01	VALVE ASSY, MBU-12/P Combination (60240)	REF	
	211-60	VALVE ASSY, MBU-12/P Combination (92114)	REF	
	G012-9002-01	MICROPHONE, Type M101/A1C (60240)	REF	
	GW9658	MICROPHONE, Type M169/A1C (60240)	REF	
-1	G001-3002-01	. BODY ASSY, Adapter Valve (60240)	1	
-2	GW-9680	. SCREW SET, Slotted Head 3 PLCS (60240)	3	
-3	GW9729	. O-RING (60240)	1	
-4	G001-3007-01	. GASKET SILICONE, Valve Sealing (60240)	1	
-5	G001-3014-01	. BRACKET ASSY, Microphone (60240)	1	
-6	G001-3004-01	. . BRACKET, Plastic (60240)	1	
-7	G001-3006-01	. . BLOCK BRASS, LH (60240)	1	
-8	G001-3006-02	. . BLOCK BRASS, RH (60240)	1	
-9	GW-9682	. . SCREW SLOTTED, Pan Headed (60240)	2	
-10	GW-9678	. . SCREW SET, Slotted (60240)	4	
-11	GW-9679	. . SCREW SLOTTED, Flat Headed (60240)	2	
-12	G001-3015-01	. CABLE AND PLUG ASSY (60240)	1	
-13	G012-9005	. . PLUG ASSY, U-179A/U (60240)	1	
-14	G001-3009-01	. . WIRE LEAD ASSY, Vinyl Covered (60240)	1	
-15	GW-9683	. . STRAIN RELIEF ASSY, Clamp (60240)	1	
-16	GW-9660	. . O-RING, Sealing Communications (60240)	1	
-17	G001-3016-01	. PLATE ASSY, Communications (60240)	1	
-18	G001-3003-01	. PLATE, Sealing Communications (60240)	1	
-19	AN500D2-3	. . SCREW, Fillister Headed (60240)	2	

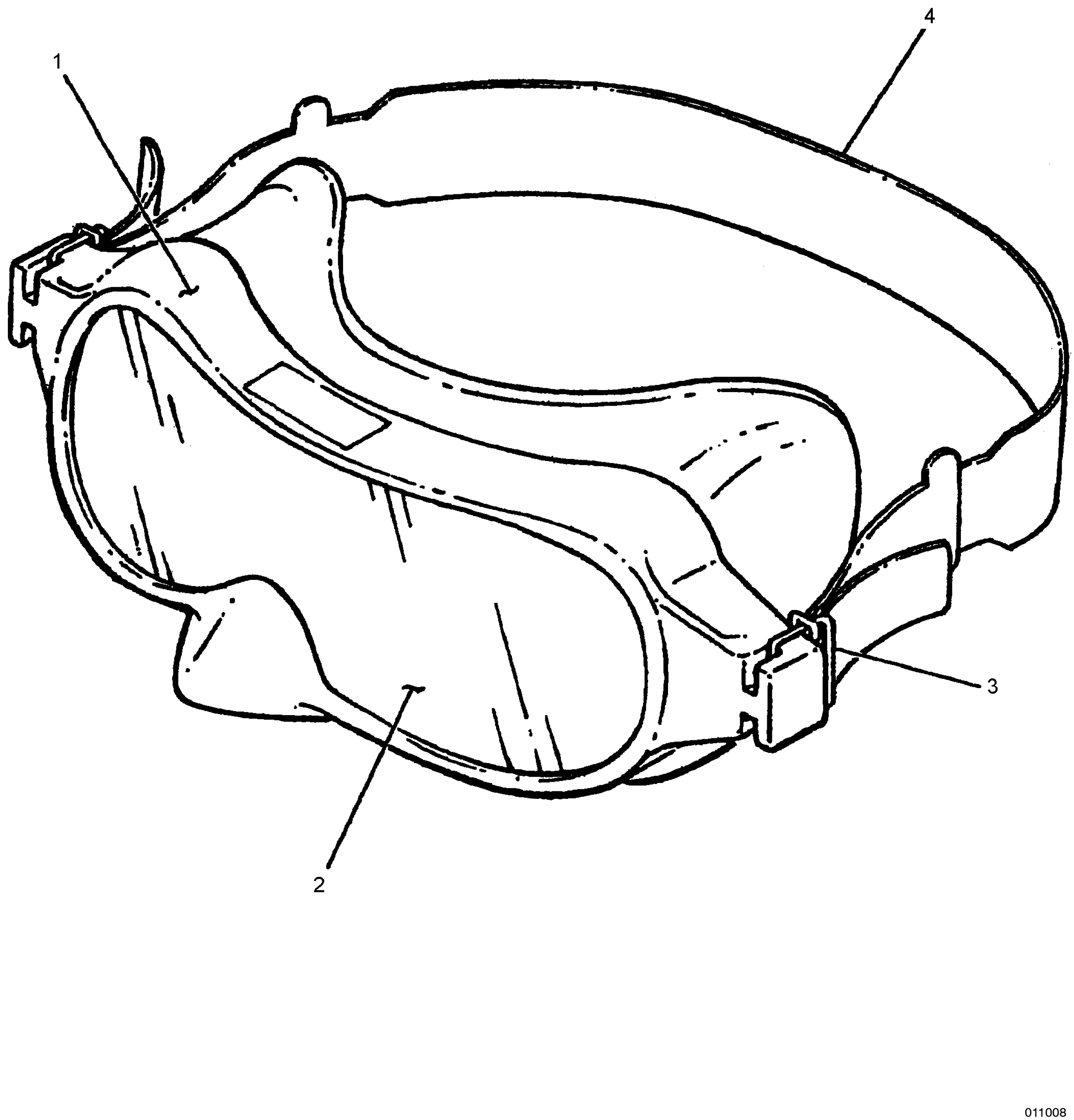

Figure 11-8. Anti-Smoke Goggle Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
11-8	322-70	GOGGLE ASSY, Anti-Smoke (92114)	REF	
-1	322-71	. FRAME, Lens, Goggle (92114)	1	
-2	322-72	. LENS, Anti-Smoke, Goggle (92114)	1	
-3	322-74	. BUCKLE ASSY (92114)	2	
-4	322-73	. HEADSTRAP (92114)	1	

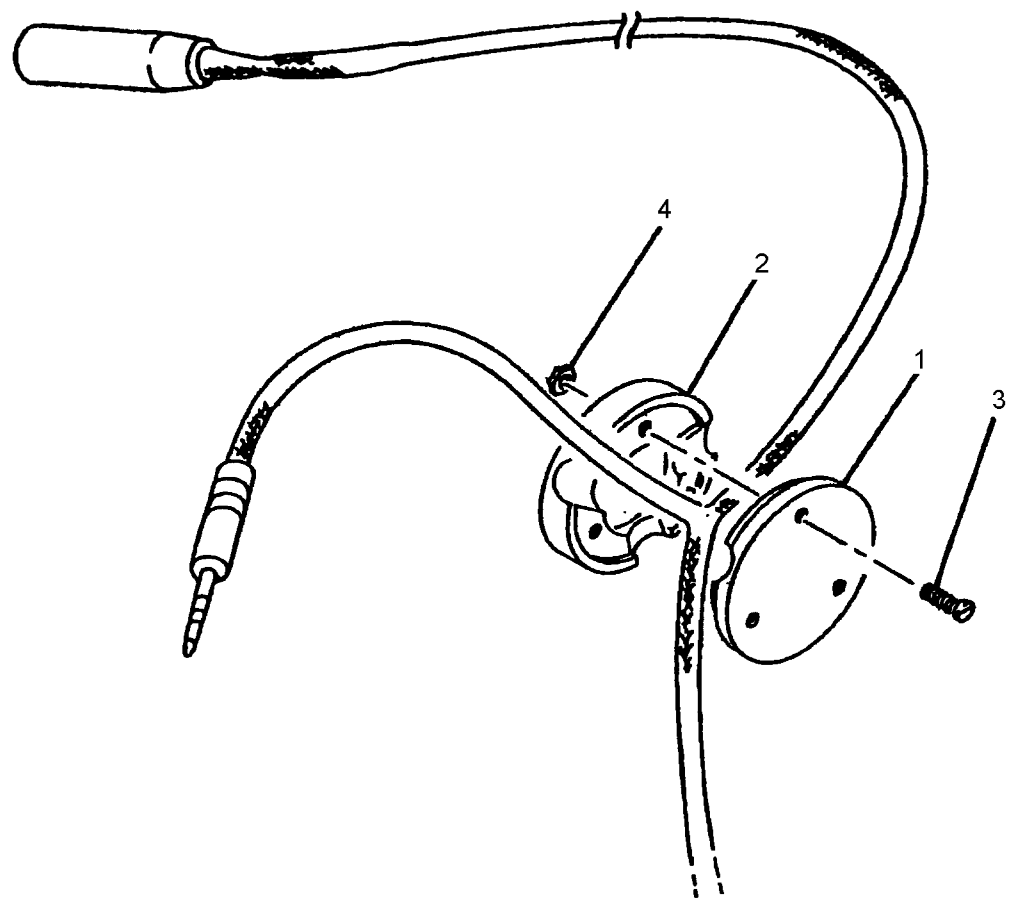

Figure 11-9. Strain Relief Assembly, Lower

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
11-9	358-1352	STRAIN RELIEF ASSEMBLY, Lower . . . . (see figure 11-6 for NHA) (92114)	REF	
-1	358-1350	. DISK, Upper (92114)	1	
-2	358-1351	. DISK, Lower (92114)	1	
-3	00-5488	. . SCREW, 1-72 x 1/4 inch long . . . . (Fillister Head) (92114)	3	
-4	00-5489	. . NUT, Hex. 1-72 x .056 inch thick . . . . (92114)	3	

NUMERICAL INDEX

Part Number	Figure and Index Number	SM&R Code	Part Number	Figure and Index Number	SM&R Code
AN500D2-3	11-7-19	XA	MS35333-35	11-6-17	XA
AN500D2-5	11-6-14	XA	MS35649-222	11-6-63	PAOZZN
AN526C1032R6	11-6-46	PAOZZN	00-5493	11-6-43	PAOZZN
AN960KD6	11-6-36	XA	00-5489	11-9-4	XA
G001-5030-01	11-7	PAOZZN	00-5488	11-9-3	XA
G001-3016-01	11-7-17	PAOZZN	00-4894-3	11-6-69	XA
G001-3015-01	11-7-12	PAOZZN	00-3244	11-6-35	XA
G001-3009-01	11-7-14	XA	00-2234	11-6-11	PAOZZN
G001-3018-01	11-6-5	PAOZZP	00-1587	11-6-13	PAOZZN
G001-3016-01	11-6-6	PAOZZN	00-1081	11-6-15	XA
G001-3003-01	11-7-18	XA	00-668	11-6-21	XA
G001-3015-01	11-6-6	PAOZZN	00-639	11-6-18	PAOZZN
G001-3014-01	11-6-6	PAOZZN	00-66	11-6-16	XA
G001-3014-01	11-7-5	PAOZZN	09168P-33	11-6-13	PAOZZN
G001-3006-02	11-7-8	XA	2089288-2302	11-6-14	XA
G001-3006-01	11-7-7	XA	211-60	11-7	PAOZZN
G001-3007-01	11-6-6	PAOZZN	232-1823	11-6-5	PAOZZP
G001-3007-01	11-7-4	LP	232-1309	11-6-9	PAOZZN
G001-3004-01	11-7-6	XA	232-1292	11-6-10	PAOZZN
G001-3001-01	11-6-6	PAOZZP	232-1110	11-6-3	PAOZZP
G001-3002-01	11-7-1	XA	232-203	11-6-30	PAOZZN
G001-3001-01	11-7	PAOZZP	232-202	11-6-31	PAOZZN
G002-1060-01	11-6-7	PAOZZN	232-115	11-6-24	XA
G012-9005	11-7-13	XA	232-94A	11-6-7	PAOZZN
G012-9002-01	11-6-12	XA	249-425	11-6-23	PAOZZN
G012-9002-01	11-7	PAOZZN	322-74	11-8-3	PAOZZN
G012-1046-01	11-6-22	PAOZZN	322-73	11-8-4	PAOZZN
G012-1034-01	11-6-23	PAOZZN	322-72	11-8-2	PAOZZN
G012-1035-01	11-6-17	XA	322-71	11-8-1	PAOZZN
G012-1033-01	11-6-19	PAOZZN	322-70	11-8	PAOZZP
G012-1036-01	11-6-4	PAOZZN	339-16	11-6-22	PAOZZN
G030-1055-01	11-6-8	PAOZZP	358-1460	11-6-57	XA
GW-9683	11-7-15	XA	358-1506V-1	11-6	PAOOP
GW-9682	11-7-9	XA	358-1506V	11-6	PAOOP
GW-9679	11-7-11	XA	358-1459	11-6-1	PAOZZN
GW-9678	11-7-10	XA	358-1362	11-6-67	PAOZZN
GW-9682 (L/P)	11-6-6	PAOZZN	358-1352	11-6-68	PAOZZN
GW-9678 (L/P)	11-6-6	PAOZZN	358-1355-3	11-6-61	PAOZZP
GW-9680	11-7-2	XA	358-1317	11-6-65	PAOZZN
GW-9660	11-7-16	XA	358-1316	11-6-66	XA
GW9658	11-7	PAOZZN	358-1309	11-6-64	PAOZZN
GW9729	11-6-20	PAOZZN	358-1358	11-6-8	PAOZZP
GW9729	11-6-6	PAOZZN	358-1315	11-6-48	PAOZZN
GW9729	11-7-3	PAOZZN	358-1314	11-6-45	PAOZZN
MS16995-2	11-6-12	XA	358-1313	11-6-44	PAOZZN
MS35190-214	11-6-62	PAOZZN	358-1351	11-9-2	XA
MS35333-39	11-6-47	PAOZZN	358-1352	11-9	PAOZZ

NUMERICAL INDEX (Cont)

Part Number	Figure and Index Number	SM&R Code	Part Number	Figure and Index Number	SM&R Code
358-1350	11-9-1	XA	358-1017-2	11-6-53	PAOZZN
358-1256-2	11-6-60	XA	358-1016	11-6-56	XA
358-1256-1	11-6-59	PAOZZP	358-1015	11-6-52	PAOZZN
358-1257	11-6-58	XA	358-1013	11-6-51	PAOZZN
358-1255-1	11-6-40	PAOZZP	358-1059	11-6-2	PAOZZN
358-1232-1	11-6-39		358-636	11-6-49	PAOZZN
358-1231	11-6-38		358-637	11-6-34	XA
358-1228-3	11-6-37	XA	358-613-4	11-6-42	PAOZZN
358-1224-3	11-6-33	PAOZZN	358-613-3	11-6-41	PAOZZN
358-1223-5	11-6-25	PAOZZP	358-174	11-6-29	PAOZZN
358-1227	11-6-26	PAOZZN	358-13	11-6-32	PAOZZN
358-1223-3	11-6-25	PAOZZP	358-15	11-6-27	PAOZZN
358-1074	11-6-50	PAOZZN	358-14	11-6-28	PAOZZN
358-1018-4	11-6-55	XA	450-134A	11-6-19	PAOZZN
358-1018-3	11-6-54	XA	834-18	11-6-4	PAOZZN

CHAPTER 12

PORTABLE OXYGEN SYSTEM P/N 6028

Section 12-1. Description

12-1. GENERAL.

12-2. The Portable Oxygen System is manufactured by Fluid Power Inc. (CAGE 99227) (figure 12-1). Table 12-1 contains the leading particulars for the Portable Oxygen System.

12-3. CONFIGURATION.

12-4. The Portable Oxygen System is supplied in one basic configuration that is composed of a 96 cubic inch high pressure oxygen cylinder, oxygen regulator, delivery hose, filler line and one way charging check valve assembly, with supporting unit frame and strap assembly.

12-5. FUNCTION.

12-6. Supply oxygen pressure of 2000 psig is stored in the 96 cubic inch oxygen cylinder. When the oxygen cylinder handwheel valve is turned off, “0” pressure will be indicated on the oxygen regulator pressure gage. When the oxygen cylinder handwheel valve is turned counterclockwise to the open position, cylinder supply will be indicated on oxygen regulator pressure gage up to 2000 psig. Then the oxygen regulator on/off toggle (green) is turned to the on position, inlet oxygen pressure is reduced down to 32 to 35 psig. With the diluter toggle (white) in the normal position, air/oxygen dilution will occur on demand up to approximately 30,000 feet. With the diluter toggle in the 100% position, 100% oxygen will be supplied upon demand up to approximately 27,000 feet where the automatic positive pressure feature begins to function. The emergency toggle (red) has three positions: neutral, emergency, and test mask. When using the emergency toggle, the diluter toggle should be in the 100% oxygen position. When the emergency toggle is in the position, 2 to 4 inches of water pressure flow will be delivered to the aircrewmember. When moving the emergency toggle to the test mask position (aircrewmember must hold the emergency toggle in this position), 6 to 16 inches of water pressure flow will be delivered to the aircrewmember.

Table 12-1. Leading Particulars

Oxygen Regulator	Automatic Positive Pressure Diluter Demand Type
Operating Pressure	50 to 2000 psig
Operating Altitude	Sea level to 43,000 feet
Air/Oxygen Dilution	Up to approximately 30,000 feet
100 Percent Oxygen	Begins approximately 27,000 feet
Oxygen Cylinder	96 cubic inch, MS26545-A1X, MS26545-A2X
Overall Dimensions:	
Weight (Approximate)	11.3 pounds
Height (Overall)	16 3/4 inches
Width (Overall)	6 5/8 inches

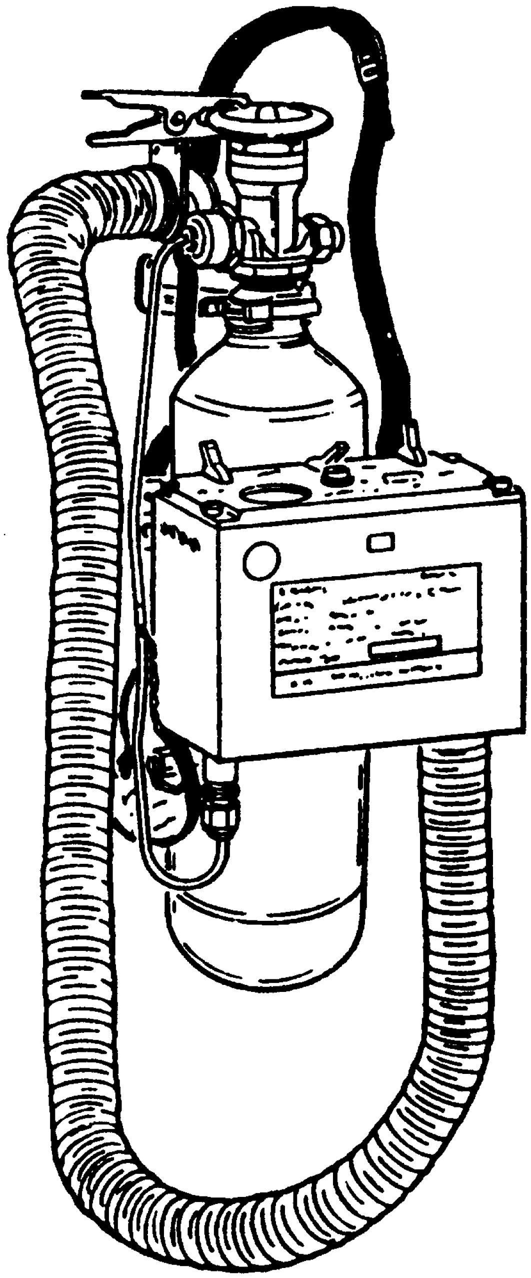

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Figure 12-1. Portable Oxygen System

12-7. SERVICE LIFE.

12-8. The Portable Oxygen System regulator shall remain in service as long as repair cost does not exceed 75% of the cost of the regulator. The 96 cubic inch oxygen cylinder falls under the Department of Transportation (D.O.T.) regulation and must be removed from service every 5 years for hydrostatic testing. The D.O.T. number (example: ICC 3AA) and the latest hydrostatic test date (example: 12/98) will be permanently stamped in the neck of the cylinder.

12-9. REFERENCE NUMBERS, ITEMS, AND SUPPLY DATA.

12-10. Section 12-4, Illustrated Parts Breakdown, contains information on each assembly, subassembly and component part of the Portable Oxygen System. The figure and index number, reference or part number, description and units per assembly are provided with the breakdown.

Section 12-2. Modifications

12-11. GENERAL.

12-12. No modifications to the Portable Oxygen System are required or authorized at this time.

Section 12-3. Maintenance

12-13. GENERAL.

12-14. This section contains procedural steps for inspection, testing, disassembly, cleaning, repair and assembly of the Portable Oxygen System.

12-15. Procedural steps outlined in this section are listed as they are required, and in the sequence in which they occur.

NOTE

The Portable Oxygen System shall be considered beyond economical repair when cost of repair parts exceeds 75% of the cost of the Portable Oxygen System.

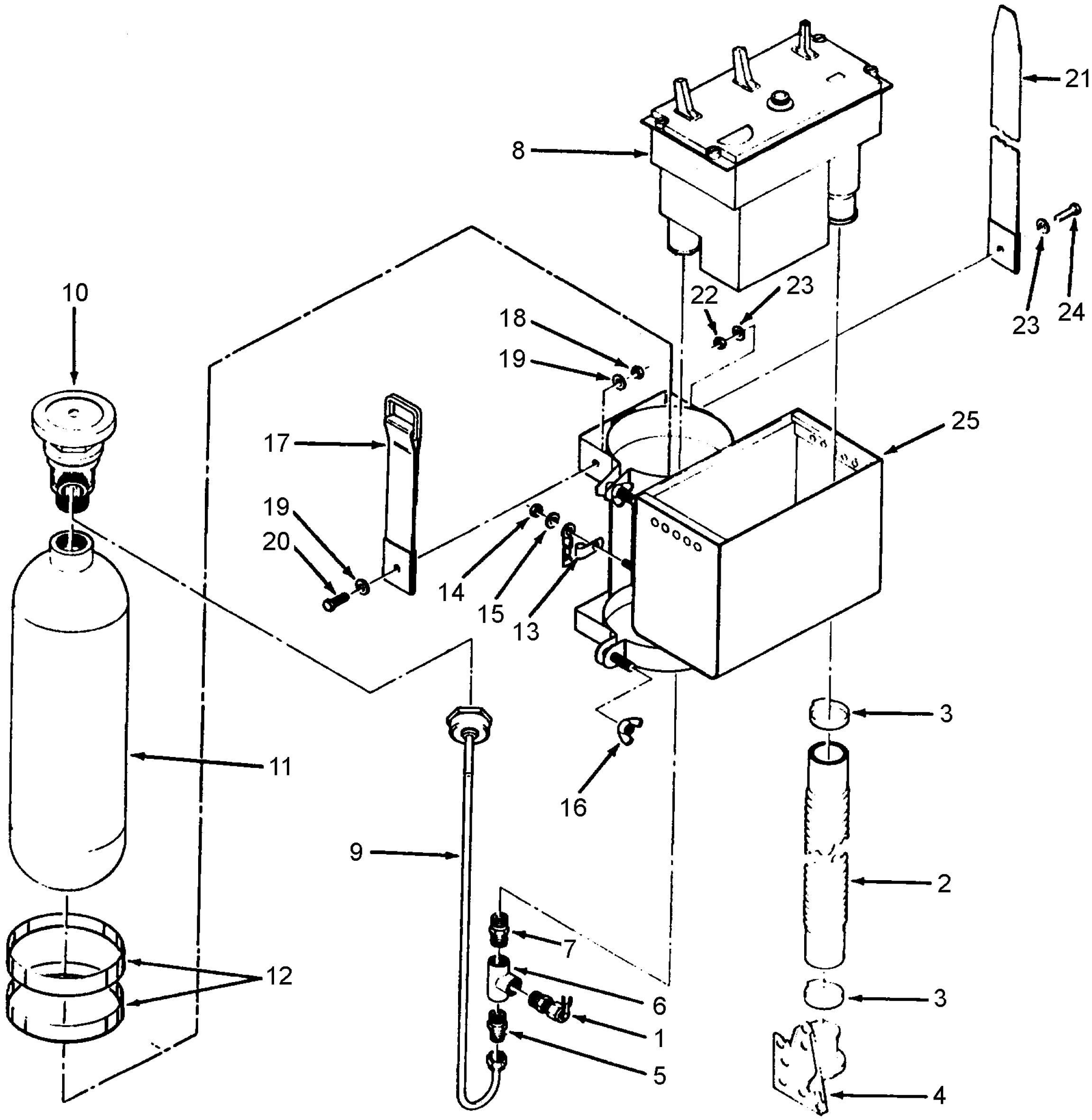
Upon completion of any maintenance action (e.g. inspection, repair, modification, etc.), be sure to make necessary entries on appropriate forms in accordance with OPNAVINST 4790.2 Series.

12-16. INSPECTION.

12-17. SPECIAL INSPECTION. The Special Inspection consists of a visual inspection and functional test of the Portable Oxygen System. The Special Inspection is performed in conjunction with the aircraft inspection requirements for the aircraft in which the Portable Oxygen System is installed.

12-18. CALENDAR INSPECTION. The Calendar Inspection shall be conducted on the Portable Oxygen System every 448 days. The Calendar Inspection consists of the following:

1. Disassembly (paragraph 12-27).
2. Cleaning (paragraph 12-29).
3. Repair (paragraph 12-31).
4. Bench Test of Oxygen Regulator (paragraph 12-22).
5. Visual Inspection (paragraph 12-19).
6. Assembly (paragraph 12-34).
7. Charge of Oxygen Cylinder (paragraph 12-25).
8. Functional Test (paragraph 12-21).



1. CHARGING CHECK VALVE ASSEMBLY
2. HOSE ASSEMBLY
3. STRAP, ELECTRICAL TIE-DOWN
4. CONNECTOR
5. UNION NIPPLE
6. TEE
7. NIPPLE
8. OXYGEN CYLINDER
9. LINE ASSEMBLY
10. CYLINDER VALVE ASSEMBLY
11. OXYGEN CYLINDER
12. CYLINDER BAND
13. LINE CLAMP
14. NUT
15. FLAT WASHER
16. WING NUT
17. SHORT STRAP ASSEMBLY
18. NUT
19. FLAT WASHER
20. MACHINE BOLT
21. LONG STRAP ASSEMBLY
22. NUT
23. FLAT WASHER
24. MACHINE BOLT
25. SUPPORT WELDMENT

Figure 12-2. Portable Oxygen System, Exploded View

12-19. VISUAL INSPECTION. To perform the Visual Inspection, proceed as follows:

NOTE

To assist in keeping track of the 96 cubic inch oxygen cylinders that are coming due for hydrostatic testing, it is highly recommended that local serial numbers be assigned and stenciled on the main body of the cylinder. Keep records of that cylinder using local assigned serial, aircraft BUNO installed on and hydrostatic test date due.

Index numbers refer to figure 12-2 unless otherwise noted.

1. Inspect oxygen regulator (8) legibility of all markings, toggle for good condition and security of attachment.

2. Inspect support weldment (25) for cracks, dents, and security of attachment.

3. Inspect oxygen hose assembly (2) for cut, tears, fraying, dry rot of rubber and security of clamps (3) and oxygen connector (4).

4. Inspect short strap assembly (17) and long strap assembly (21) for cuts, tears, fraying, good condition and security of attachment machine bolts (20 and 24), washers (19 and 23) and nuts (18 and 22).

5. Inspect cylinder valve assembly (10) for good condition.

6. Inspect oxygen cylinder (11) condition and in service hydrostatic test date stamped in neck of cylinder.

7. Inspect charging check valve assembly (1) for good condition and security of attachment.

8. Inspect tee (6) for cracks and good condition.

9. Inspect union nipple (5), nipple (7), and line (9) for good condition and security of attachment.

10. Replace all defective parts.

12-20. TESTING.

12-21. FUNCTIONAL TEST. To perform the Functional Test on the Portable Oxygen System, proceed as follows:

NOTE

Index numbers refer to figure 12-2 unless otherwise noted.

1. Ensure oxygen regulator (8) supply toggle (green toggle) is in the off position, diluter toggle (white toggle) is in the 100% position, and emergency toggle (red toggle) is in the neutral position.

2. Turn oxygen cylinder valve assembly (10) to the full open position. Oxygen regulator (8) pressure gage should indicate between 1800 to 2000 psig. There should be no flow out of oxygen connector (4).

3. Move oxygen regulator (8) supply toggle (green toggle) to the on position. There should be no flow out of oxygen connector (4).

4. Move oxygen regulator (8) emergency toggle (red toggle) to the emergency position. There should be an audible flow out of oxygen connector (4).

5. Move oxygen regulator (8) emergency toggle (red toggle) to the neutral position. There should be no flow out of oxygen connector (4).

6. Move and hold in position oxygen regulator (8) emergency toggle (red toggle) to test mask position. There should be an audible flow out of oxygen connector (4).

7. Release oxygen regulator (8) emergency toggle (red toggle). It should automatically return to the neutral position and there should be no flow out of oxygen connector (4).

8. Turn oxygen cylinder valve assembly (10) to full off position.

9. Move oxygen regulator (8) emergency toggle (red toggle) to the emergency position to bleed pressure from oxygen regulator (8), then move emergency toggle back to the neutral position.

10. Move oxygen regulator (8) supply toggle (green toggle) to the off position.

11. If portable oxygen system fails functional test, replace with RFI unit.

12. Charge or top off Portable Oxygen System in accordance with paragraph 12-25, as necessary.

12-22. BENCH TEST OXYGEN REGULATOR. Forward oxygen regulator to AIMD or MALS for bench test in accordance with NAVAIR 13-1-6.4-2.

12-23. STORAGE.

12-24. STORAGE OF PORTABLE OXYGEN SYSTEM ABOARD THE AIRCRAFT. Figure 12-3 shows typical storage aboard the aircraft.

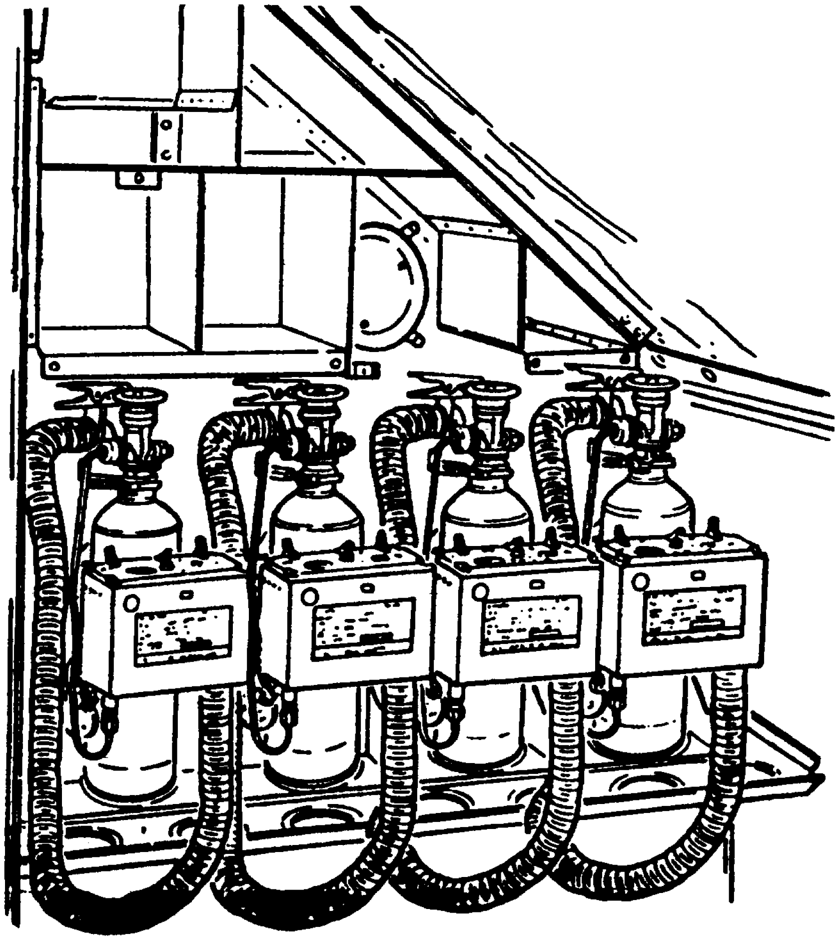


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Figure 12-3. Typical Storage of Portable Oxygen System on Aircraft

12-25. CHARGING.

12-26. To charge the Portable Oxygen System, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Oxygen, Aviator's Breathing	MIL-O-27210, Type 1

NOTE

Personnel operating oxygen recharge spin cart should be thoroughly familiar with all valves and controls. Prior to operating, refer to appropriate ground support equipment manual and servicing placard on spin cart for recharging operation procedures. Personnel operating oxygen spin cart shall be licensed in accordance with OPNAVINST 4790.2 Series.

Index numbers refer to figure 12-2 unless otherwise noted.

1. Disconnect dust cap from charging check valve assembly (1).

2. Connect servicing line from oxygen spin cart.

3. Ensure oxygen regulator (8) supply toggle (green toggle) is in the off position.

4. Turn cylinder valve assembly (10) to full open position.

NOTE

During filling operation Portable Oxygen System servicing pressure will be indicated on oxygen regulator (8) pressure gage.

5. Using oxygen spin cart, fill the Portable Oxygen System to 1800 to 2000 psig in stages outlined in table 12-2. Fill time for each stage is a minimum of 3 minutes with a 2 minute cool down period.

6. Shut down and secure oxygen spin cart.

7. Turn Portable Oxygen System cylinder valve assembly (10) to full off position.

8. Move oxygen regulator (8) supply toggle (green toggle) to on position.

9. Move oxygen regulator (8) emergency toggle (red toggle) to test mask position to bleed pressure from Portable Oxygen System, then release emergency toggle.

10. Move oxygen regulator (8) supply toggle to off position.

11. Disconnect oxygen spin cart servicing line from Portable Oxygen System charging check valve assembly (1).

12. Install dust cap on to Portable Oxygen System charging check valve assembly (1).

12-27. DISASSEMBLY.

12-28. To disassemble the Portable Oxygen System, proceed as follows:

WARNING

Prior to disassembly, ensure oxygen cylinder valve (10) is in the fully closed position. Turn oxygen regulator (8) supply toggle to the on position and depress emergency toggle to test mask position to bleed pressure from system. Release emergency toggle and move supply toggle to the off position.

NOTE

Index numbers refer to figure 12-5 unless otherwise noted.

Disassemble the Portable Oxygen System only as far as necessary to perform a repair action or specific maintenance function.

1. Remove cap and chain assembly from charging check valve assembly (1) and remove charging check valve assembly (1) from tee (6).

2. Remove nut (14), washer (15), and clamp (13).

3. Loosen and free line assembly (9) nuts from cylinder assembly (10) and union nipple (5). Remove line assembly (9).

Table 12-2. Cylinder Filling Stages

STAGE	PSIG
1	0-500
2	500-1000
3	1000-1500
4	1500-1800
5	1800-2000

AMBIENT AIR TEMPERATURE		CHARGING PRESSURE
°F	°C	PSIG
0	-18	1550-1750
10	-12	1600-1775
20	-7	1625-1800
30	-1	1675-1850
40	5	1700-1875
50	10	1725-1925
60	16	1775-1975
70	21	1800-2000
80	27	1825-2050
90	32	1875-2075
100	38	1900-2125
110	43	1925-2150
120	49	1975-2200
130	54	2000-2225

4. Turn each of the four dzus fasteners on oxygen regulator (8) 1/4 turn counterclockwise. Slide oxygen regulator (8) from support weldment (25) far enough to access clamp (3).

5. Loosen hose clamp (3) and remove hose assembly (2) from oxygen regulator (8) outlet. Remove oxygen regulator (8) from support weldment (25).

6. Loosen clamp (3) and remove oxygen connector (4) from hose assembly (2).

7. Remove union nipple (5), tee (6), and nipple (7) from oxygen regulator (8) inlet assembly.

8. Remove two wing nuts (16) to loosen two support weldment (25) clamps and remove oxygen cylinder (11) from support weldment (25).

NOTE

Do not remove cylinder bands (12) from oxygen cylinder (11) unless replacement is necessary.

Intermediate level maintenance activities are not authorized to remove and replace cylinder valve assembly (10). Special vacuum heat drying equipment is required when removing and replacing cylinder valve assembly (10).

Removal of short strap assembly (17) and long strap assembly (21) is not required unless replacement is required.

9. Remove short strap assembly (17) from support weldment (25) by removing nut (18), washer (19), and bolt (20).

10. Remove long strap assembly (21) from support weldment (25) by removing nut (22), washer (23), and bolt (24).

11. Forward oxygen regulator assembly (8) to AIMD or MALS for bench test and repair.

12-29. CLEANING.

12-30. To clean the Portable Oxygen System parts, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Dishwashing Liquid, Ivory Liquid or Equivalent	Local Purchase
As Required	Cloth, Lint-Free	MIL-C-85043

NOTE

Do not clean oxygen cylinder (11) using NOC process. Clean external body of oxygen cylinder (11) in accordance with the procedure outlined in step 3 of this paragraph.

1. Clean oxygen line (9) in accordance with procedures outlined in NAVAIR 13-1-6.4-1.

2. Clean all metal parts (with exception of oxygen cylinder assembly (11)) in accordance with procedures outlined in NAVAIR 13-1-6.4-1.

3. Clean external body of oxygen cylinder assembly (11) by mixing 1 part Ivory liquid (or equivalent) to 5 parts water and wiping clean with a lint-free cloth. Wipe dry cylinder with a lint-free cloth.

12-31. REPAIR.

12-32. Repair of the Portable Oxygen System is limited to the fabrication of short strap (17) and long strap (21). All other defective components shall be replaced with new components. To fabricate new short strap (17) or long strap (21), proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Webbing, Nylon, 1 inch, Type XVII	MIL-W-4088 NIIN 00-260-6906
2	Ring, Metallic	MIL-R-3390 NIIN 00-202-0228
2	Grommet, Metallic Spur, Size O	NIIN 00-231-6582
As Required	Thread, Nylon, Size E	VT-295 NIIN 00-616-0079

1. Fabricate short strap assembly (17) as per figure 12-4, view B.

2. Fabricate long strap assembly (21) as per figure 12-4, view A.

12-33. VISUAL INSPECTION. Perform Visual Inspection of disassembled parts in accordance with paragraph 12-19.

12-34. ASSEMBLY.

12-35. To assemble the Portable Oxygen System, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Tape, Anti-seize	MIL-T-27730A

NOTE

Index numbers refer to figure 12-5 unless otherwise noted.

1. Attach short strap (17) to support weldment (25) and secure with bolt (20), washers (19) and nut (18).

2. Attach long strap (21) to support weldment (25) and secure with bolt (24), washers (23) and nut (22).

3. Install cylinder bands (12) onto cylinder (11) and install cylinder (11) into support weldment (25) clamps, align cylinder bands (12) with support weldment (25) clamps and tighten two wing nuts (16) to hold cylinder until line assembly (9) is installed.

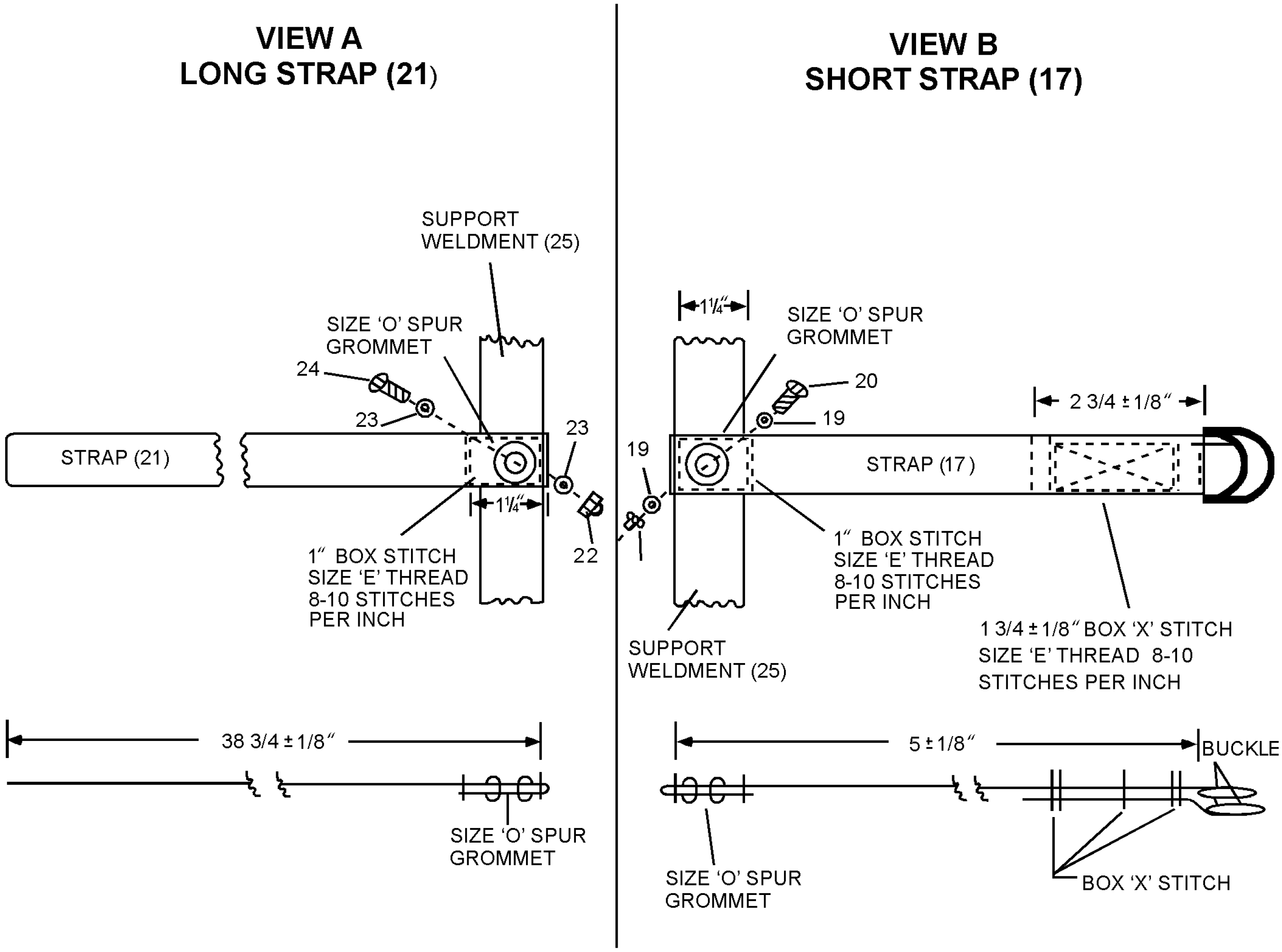

Figure 12-4. Short and Long Strap

4. Apply anti-seize tape to pipe threads of nipple (7) and union nipple (8) and screw nipple (7) and union nipple (8) into tee (6).

5. Attach union nipple (5), tee (6), and nipple (7) to oxygen regulator (8) by screwing nipple (7) into oxygen regulator (8) inlet.

6. Loosely install one clamp (3) onto one end of hose (2). Install oxygen connector (4) onto hose (2) and secure with clamp (3).

7. Slide hose (2) through large hole on bottom of support weldment (25) and loosely install remaining clamp (3) onto hose (2). Attach hose (2) to oxygen regulator (8) outlet and secure with clamp (3).

8. Slide oxygen regulator (8) into support weldment (25) and secure to support weldment (25) by turning 4 Dzus fasteners on oxygen regulator (8) clockwise 1/4 turn.

CAUTION

Do not bend line assembly (9) when assembling to union nipple (5) and cylinder valve (10). Adjust position of cylinder and valve (11) as described in step 9 below to align connections.

9. Connect line assembly (9) to union nipple (5). Loosen two wing nuts (16) and adjust cylinder (11) and valve (10) assembly position in support weldment (25) to align valve assembly (10) with line assembly (9), screw line assembly (9) nut onto valve assembly (10). Tighten two wing nuts (16) to secure cylinder (11) and valve (10) assembly to support weldment (25). Position clamp (13) onto line assembly (9) and attach clamp (13) onto screw protruding out of support weldment (25) box. Attach charging valve (1) cap chain ring onto screw protruding out of support weldment (25) box, install washer (15) onto screw protruding out of support weldment (25) box and secure line assembly (9) and charging valve (1) cap and chain to support weldment (25) box with nut (14).

10. Apply anti-seize tape to pipe threads of charging check valve assembly (1) and screw charging check valve assembly (1) into tee (6).

11. Screw charging check valve assembly (1) dust cap onto charging check valve assembly (1).

12-36. POST ASSEMBLY TESTING. To perform post assembly testing, proceed as follows:

1. Charge Portable Oxygen System in accordance with paragraph 12-25.

2. Perform Functional Test in accordance with paragraph 12-21.

Section 12-4. Illustrated Parts Breakdown

12-37. GENERAL.

12-38. This section lists and illustrates the assemblies and detail parts of the Portable Oxygen System manufactured by Fluid Power Inc. (CAGE 99227) Part No. 6028.

12-39. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

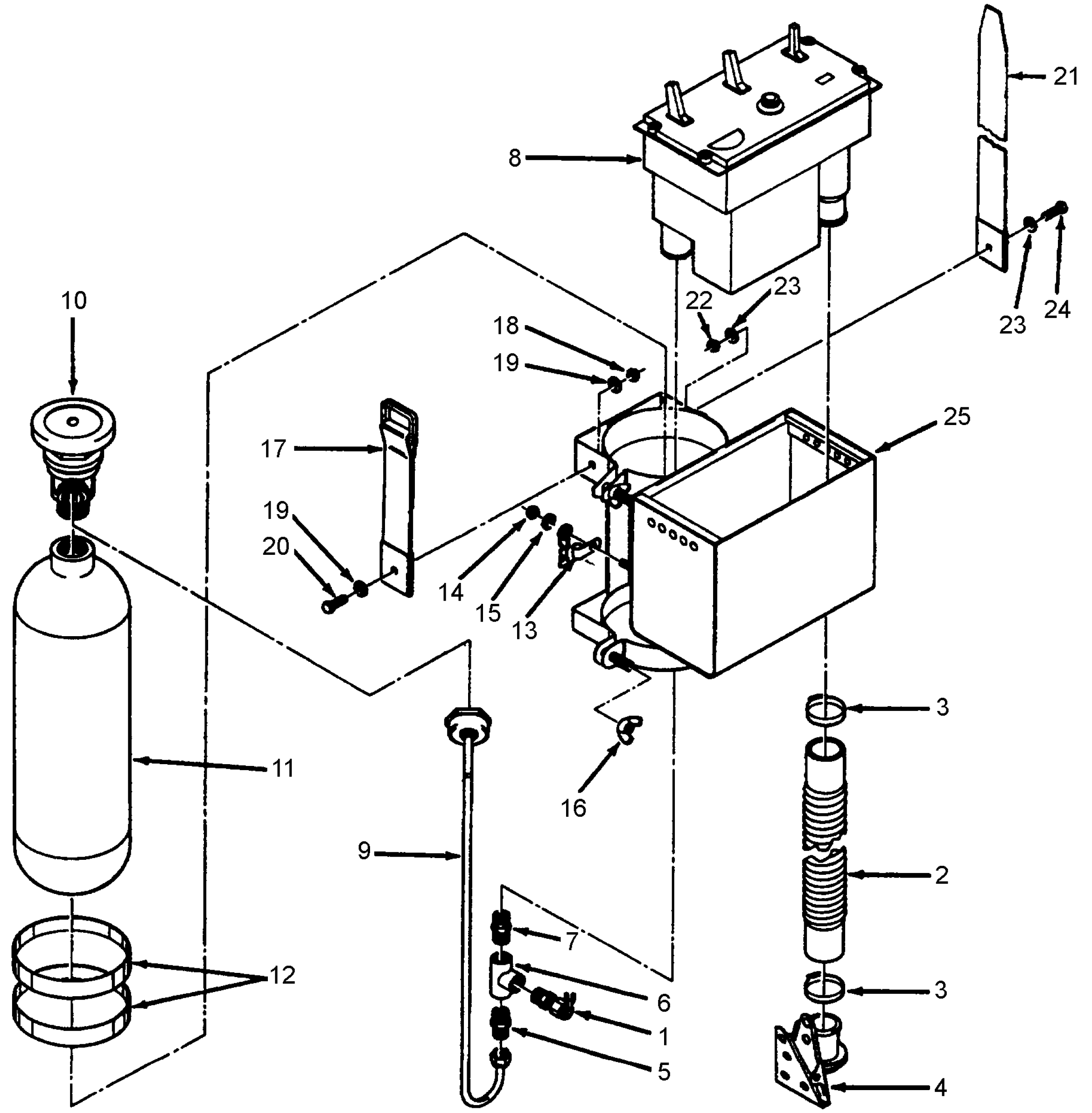

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Figure 12-5. Portable Oxygen System

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
12-5	6028	PORTABLE OXYGEN SYSTEM	1	
-1	4215	. CHECK VALVE ASSEMBLY, ... Charging (NIIN 00-764-3294)	1	
-2	MS22055H36	. . HOSE ASSEMBLY (96906) (99227 . . . . Part number 1386)	1	
-3	MS22064-5	. . . CLAMP, Hose (AP) (96906) (99227 . . . . . . Part number 1382)	2	
-4	MS22058-1	. . . CONNECTOR, Oxygen hose to . . . . regulator (96906) (99227 Part number 4085)	1	
-5	AN780-3	. . NIPPLE, Union (88044)	1	
-6	AN917-1	. . TEE, Internal pipe thread (88044)	1	
-7	AN911-1	. . NIPPLE, Pipe thread (88044)	1	
-8	MS22062-1	. . REGULATOR, Oxygen (96906) (Note 2)	1	
	14800-8B	. . REGULATOR, Oxygen (96906) (Note 2)	1	
	14800-8C (CRU-72/A)	. . REGULATOR, Oxygen (96906) (Note 2)	1	
	29255-6B-A1	. . REGULATOR, Oxygen (96906) (Note 2)	1	
	29255-6B-B1	. . REGULATOR, Oxygen (96906) (Note 2)	1	
-9	6045	. LINE ASSEMBLY (NIIN 00-106-7439)	1	
	5130	. CYLINDER AND VALVE ASSEMBLY MS26545A1X0096	1	
-10	5500	. . VALVE, Cylinder (NIIN 00-794-5984)	1	
-11	6060	. . CYLINDER, Oxygen (NIIN 00-883-1844) . . .	1	
-12	2733	. BAND, Cylinder	2	
	6032	. SUPPORT ASSEMBLY (NIIN 00-003-8894) . . .	1	
-13	6034	. . CLAMP, Line (NIIN 01-280-0992) . . . . (ATTACHING PARTS)	1	
-14	MS35650-302	. . NUT (96906)	1	
-15	AN960-10	. . WASHER, Flat (88044) . . . . ---*---	1	
-16	AN350-1032	. . NUT, Wing (88044)	2	
-17	6040	. . STRAP ASSEMBLY, Short . . . . (ATTACHING PARTS)	1	
-18	MS20365-1032	. . NUT (96906)	1	
-19	AN960-10	. . WASHER, Flat (88044)	2	
-20	AN3-4	. . BOLT, Machine (88044) . . . . ---*---	1	

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
-21	6039	. . STRAP ASSEMBLY, Long	1	
		(ATTACHING PARTS)		
-22	MS20365-1032	. . NUT (96906)	1	
-23	AN960-10	. . WASHER, Flat (88044)	2	
-24	AN3-4	. . BOLT, Machine (88044)	1	
		---*---		
-25	6031	. . SUPPORT WELDMENT	1	

Notes: 1. Most parts listed in IPB may not be stocked in supply system. For these parts, activities must order the parts open purchase from the following company:
Fluid Power Inc.
1300 Hudson Gate Dr.
P.O. Box 208
Hudson, Ohio 44236
TEL: (330) 653-5107

2. See NAVAIR 13-1-6.4-2 for IPB.

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NUMERICAL INDEX

Part Number	Figure and Index Number	SM&R Code
AN3-4	12-5-20	
AN3-4	12-5-24	
AN350-1032	12-5-16	
AN780-3	12-5-5	
AN911-1	12-5-7	
AN917-1	12-5-6	
AN960-10	12-5-15	
AN960-10	12-5-19	
AN960-10	12-5-23	
MS20365-1032	12-5-18	
MS20365-1032	12-5-22	
MS22055H36	12-5-2	
MS22058-1	12-5-4	
MS22062-1	12-5-8	
MS22064-5	12-5-3	
MS35650-302	12-5-14	
14800-8B	12-5-8	
14800-8C (CRU-72/A)	12-5-8	
2733	12-5-12	
29255-6B-A1	12-5-8	
29255-6B-B1	12-5-8	
4215	12-5-1	
5130	12-5-9	
5500	12-5-10	
6028	12-5	
6031	12-5-25	
6032	12-5-12	
6034	12-5-13	
6039	12-5-21	
6040	12-5-17	
6045	12-5-9	
6060	12-5-11	

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CHAPTER 13

HIGH PRESSURE OXYGEN MANIFOLD AND CHECK VALVE ASSEMBLY

P/N B40831-1

Section 13-1. Description

13-1. GENERAL.

13-2. The High Pressure Oxygen Manifold and Check Valve Assembly CRU-108/A26U (P/N B40831-1) is manufactured by Carleton Technologies, Inc. (CAGE 05395) for use on the P-3 series aircraft (figure 13-1). The manifold and check valve assembly is designed for routing system high pressure oxygen to the aircraft pressure reducer assembly and to serve as a connection for filling of oxygen cylinders installed in the aircraft. Table 13-1 contains leading particulars for the high pressure oxygen manifold and check valve assembly.

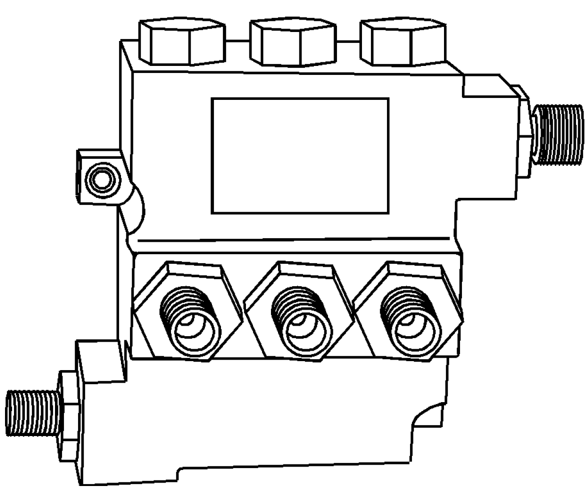


Figure 13-1. High Pressure Oxygen Manifold and Check Valve Assembly CRU-108/A26U

Table 13-1. Leading Particulars for High Pressure Oxygen Manifold and Check Valve Assembly

P/N	B40831-1
Ports	C1, C2, C3, Outlet, Filler
Weight	3.5 lbs
Height	3 1/2 in.
Length	1 1/2 in.
Width	3 1/2 in.
Operating Pressure Range	50 to 2100 psig

13-3. CONFIGURATION.

13-4. The Oxygen Manifold and Check Valve (P/N B40831-1) is a manifold body that utilizes 5 adapters (P/N B40833-1) for mating the manifold and check valve to the aircraft system.

13-5. FUNCTION.

13-6. The manifold and check valve assembly filler port is connected to the aircraft oxygen high pressure check valve, ports C1, C2, and C3 are connected to the three aircraft oxygen supply cylinders, and the outlet port is connected to the system oxygen pressure reducer assembly and system high pressure oxygen gage. The manifold assembly incorporates six gravity fed check valves which prevent the flow of oxygen from one cylinder to another and from the oxygen cylinders back through the manifold filler valve. The manifold assembly outlet port routes system oxygen to the high pressure gage and oxygen pressure reducer assembly (figure 13-2).

13-7. SERVICE LIFE.

13-8. The manifold and check valve assembly shall remain in service as long as repair cost does not exceed 75% of cost of the value.

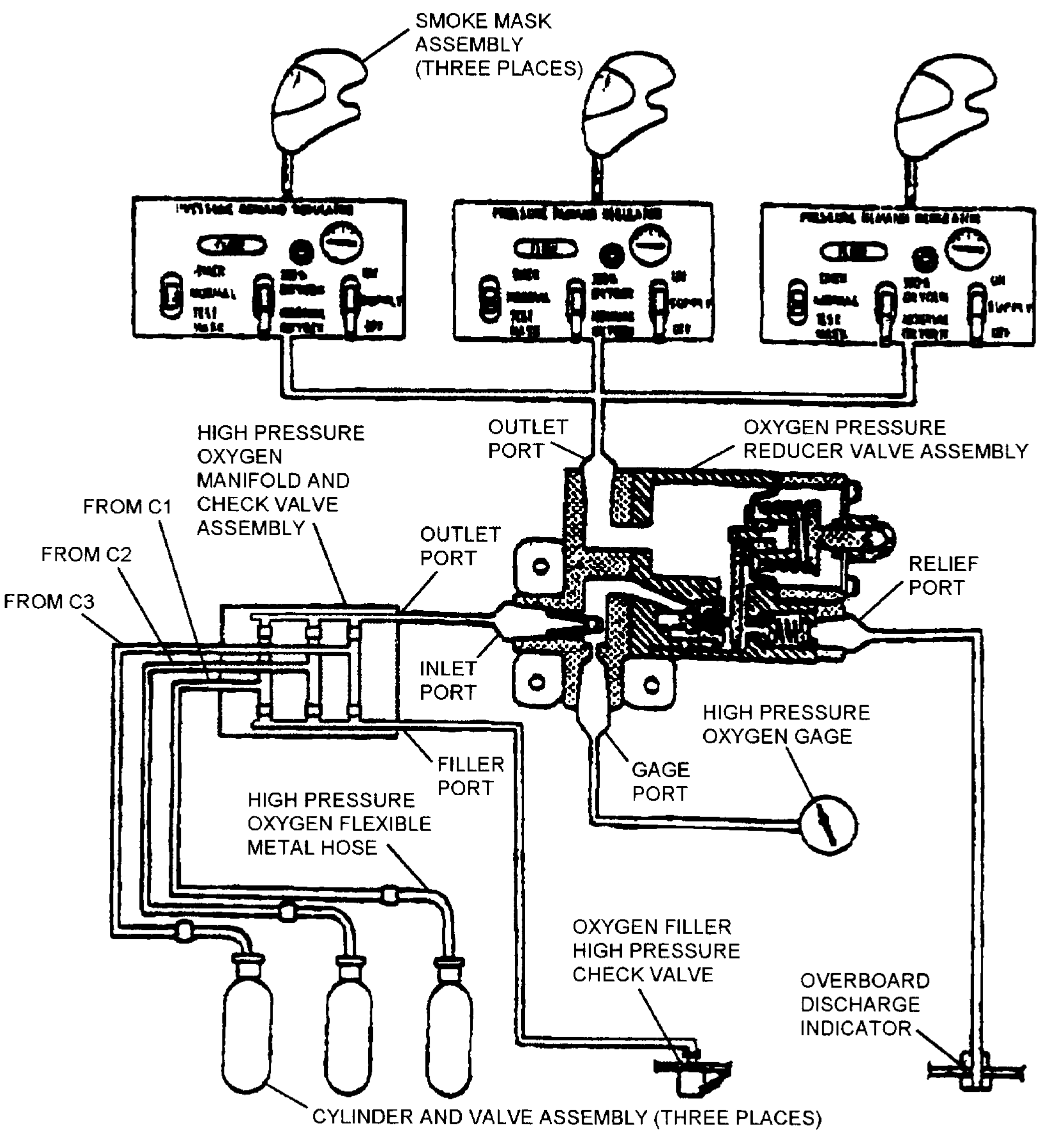


Figure 13-2. Functional Diagram of P-3 Oxygen System

13-9. REFERENCE NUMBERS, ITEMS, AND SUPPLY DATA

13-10. Section 13-5, Illustrated Parts Breakdown, contains information on the assembly and each component part of the manifold assembly. The figure and index number, reference or part number, description, and units per assembly are provided with the breakdown.

Section 13-2. Modifications

13-11. GENERAL.

13-12. No modifications to this valve assembly are required or authorized at this time.

Section 13-3. Performance Test Sheet Preparation

13-13. GENERAL.

13-14. Flows provided in applicable directives are stated in liters per minute (lpm) and are not measurable by the manometers used in the oxygen system component test stands. Flows must be converted to inches of water (inH_2O), the form of measurement which can be read on test stand manometers.

NOTE

The various graphs supplied with each test stand, Models 1172AS100 and 1316AS100 are used in converting flows. These graphs are not interchangeable between test stands. A new set of graphs will be provided each time the test stand is calibrated.

13-15. The information provided in the tables in this section is to be recorded on the Performance Test Sheet (figure 13-3).

13-16. The Performance Test Sheet is a sample only but may be reproduced for local use.

13-17. The following test requires conversion of flow from actual lpm to indicated inH_2O.

1. Check Valve and Outlet Flow Test. To convert the actual 50 liter per minute to inH_2O, proceed as follows:

a. Using the vent flow graph, find 50 lpm at bottom of graph, trace up to nitrogen line on the graph, then to the left for equivalent inH_2O flow.

b. Record inH_2O flow on Performance Test Sheet in space provided.

13-18. The following tests require no conversion flows:

1. External Leakage Test.

2. Outlet Flow Check Valve Leakage Test.

3. Filler Flow Check Valve Leakage Test.

4. Oxygen Purge.

PERFORMANCE TEST SHEET
HIGH PRESSURE OXYGEN MANIFOLD AND CHECK VALVE ASSEMBLY
PART NUMBER B40831-1

Date: ____________ Part No. ____________ Manifold Serial No. ________________ Test Stand Serial No. __________

Test Stand Operator ______________________________ Inspected By (CDI/QAR) ______________________________

1. External Leakage Test:

   A. 500 psig (No leakage allowed) ______________________

   B. 1500 psig (No leakage allowed) ______________________

2. Outlet Flow Check Valve Leakage Test: (50 and 1000 psig applied to outlet 50 CCM maximum leak)

   A. C1 Port Leakage: 50 psig ________ 1000 psig ________

   B. C2 Port Leakage: 50 psig ________ 1000 psig ________

   C. C3 Port Leakage: 50 psig ________ 1000 psig ________

3. Filler Flow Check Valve Leakage Test: (50 and 1000 psig applied to ports C1, C2, C3 50 CCM maximum leak)

   A. C1 Port Leakage: 50 psig ________ 1000 psig ________

   B. C2 Port Leakage: 50 psig ________ 1000 psig ________

   C. C3 Port Leakage: 50 psig ________ 1000 psig ________

4. Flow Check Valve and Outlet Flow Test: (140 psig, 50 LPM _______ inH_2O, 20 psig Difference)

   A. C1 Port: N_2 Input Press Gage (27) Reading ______________

   B. C2 Port: N_2 Input Press Gage (27) Reading ______________

   C. C3 Port: N_2 Input Press Gage (27) Reading ______________

   D. Outlet Port: N_2 Input Press Gage (27) Reading ____________

5. Manifold and Check Valve Assembly Purge: (200 psig Aviators Breathing Oxygen for 3 minutes)

Figure 13-3. Manifold and Check Valve Assembly Performance Test Sheet

Section 13-4. Maintenance

13-19. GENERAL.

13-20. This section contains the procedural steps for inspecting, testing, disassembly, and assembly of the manifold and check valve assembly.

13-21. Procedural steps outlined in this section are listed as they are required and in the sequence in which they occur.

NOTE

The manifold assembly shall be considered beyond economical repair when cost of repair parts exceeds approximately 75% of the cost of the manifold and check valve assembly.

Upon completion of any maintenance action (e.g. inspection, repair, modification, etc.), be sure to make the necessary entries on the appropriate forms in accordance with OPNAVINST 4790.2 Series.

13-22. INSPECTION

13-23. SPECIAL INSPECTION. The Special Inspection consists of a visual inspection performed in conjunction with the aircraft inspection requirements for aircraft in which the manifold and check valve assembly is installed. To perform the inspection, visually inspect the following:

1. Legibility of all markings.

2. Manifold assembly and surrounding area for freedom from dirt, grease, oil, hydraulic fluid, and other hydrocarbons.

3. Line connections for security of attachment and good condition.

4. Manifold assembly for obvious damage and good condition.

13-24. BENCH TEST.

13-25. To bench test the manifold and check valve assembly, proceed as follows:

WARNING

Because of possible vacuum pump explosion, only Water Pumped Nitrogen, Type 1, Class 1, Grade B (A-A-59503) shall be used when testing oxygen components.

For oxygen test stands, use only Nitrogen from gray cylinders marked NITROGEN OIL FREE in white letters. Two 3-inch wide black bands mark the top of these cylinders. Do not use 3500 psig cylinders as these cylinders are components of Nitrogen Servicing Trailers and cannot be certified contaminant free.

Prior to performing Bench Test on manifold assemblies that have been inducted for scheduled or unscheduled maintenance, the manifold assembly shall be disassembled, cleaned and reassembled in accordance with paragraphs 13-32 through 13-41.

NOTE

Oxygen Systems Components Test Stand Model 1172AS100 or 1316AS100 shall be used for performing Bench Test. Do not attempt to operate test stand without first becoming familiar with the operation of test stand. Refer to appropriate ground support equipment manual.

A high pressure source of nitrogen, other than the test will be needed when performing some of the required test.

The Bench Test shall be performed prior to placing the manifold and check valve assembly in service, in accordance with aircraft inspection cycle every 448 days or after any unscheduled repair action. The Performance Test Sheet (figure 13-3) may be reproduced and used for recording readings.

13-26. EXTERNAL LEAKAGE TEST. To perform the External Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Leak Detection, Type I	MIL-L-25567
As Required	Nitrogen Oil-free, Water Pumped, Type 1, Class 1, Grade B	A-A-59503 NIIN 01-028-9402

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter Assembly	Fabricate in IAW figure 13-4
1	Oxygen Systems Components Test Stand	1172AS100 or 1316AS100

1. Ensure manifold assembly has been disassembled, cleaned, lubricated and reassembled and was received from squadron with appropriate fittings for the filler, C1, C2, C3, and outlet ports.

2. Cap outlet and bottle ports C1, C2, and C3 of the manifold assembly.

3. Connect filler of manifold assembly to N_2 INPUT connection (18) in the altitude chamber using adapter (figure 13-4) and flared fitting No. 4 to No. 5 or No. 5 to No. 5, as required.

4. Ensure all test stand valves and regulators are properly secured and open nitrogen cylinder. Cylinder pressure indicated on SUPPLY PRESSURE gage (9) shall be at least 1500 psig.

5. Position manifold assembly in altitude chamber and close altitude chamber door.

6. Turn INLET PRESS. ON/OFF valve to ON position.

7. Using HIGH PRESS. regulator (Q), slowly apply 500 psig to manifold assembly as indicated on REGULATED HIGH PRESS. gage (10).

WARNING

Prior to use, inspect leak detection compound. Compound which is not clear and free from suspended materials/sediment is considered contaminated and shall be disposed of.

8. Open altitude chamber door. Apply leak detection compound to all fittings to check for leakage. No leakage is allowed. Record results on Performance Test Sheet.

9. Reposition manifold in altitude chamber and close altitude chamber door.

10. Using HIGH PRESS. regulator (Q), slowly apply 1500 psig to manifold assembly as indicated on REGULATED HIGH PRESS. gage (10).

11. Open altitude chamber door. Apply leak detection compound to all fittings to check for leakage. No leakage is allowed. Record results on Performance Test Sheet.

12. Turn HIGH PRESS. regulator (Q) to vent and open SYSTEM BLEED valve (S) to bleed pressure from manifold assembly.

13. Close SYSTEM BLEED valve (S) and turn INLET PRESS. valve (L) to OFF.

14. Dry manifold assembly of all leak detection compound.

15. If manifold assembly failed external leakage test, refer to troubleshooting (table 13-2). If no leakage occurred, proceed to next test.

13-27. OUTLET FLOW CHECK VALVE LEAKAGE TEST. To perform the Outlet Flow Check Valve Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen Oil-free, Water Pumped, Type 1, Class 1, Grade B	A-A-59503 NIIN 01-028-9402

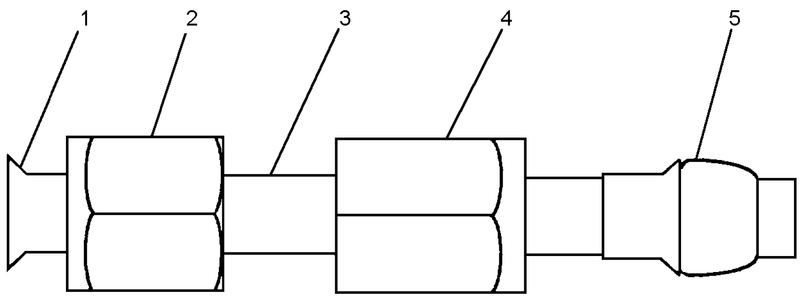
Support Equipment Required

Quantity	Description	Reference Number
1	Adapter Assembly	Fabricate in IAW figure 13-4
1	Oxygen Systems Components Test Stand	1172AS100 or 1316AS100

CAUTION

The manifold assembly shall be positioned with C1, C2, and C3 arrows pointing up during the entire bench test to allow balls to seat properly.

1. Disconnect filler port from N_2 INPUT connection (18) in altitude chamber.

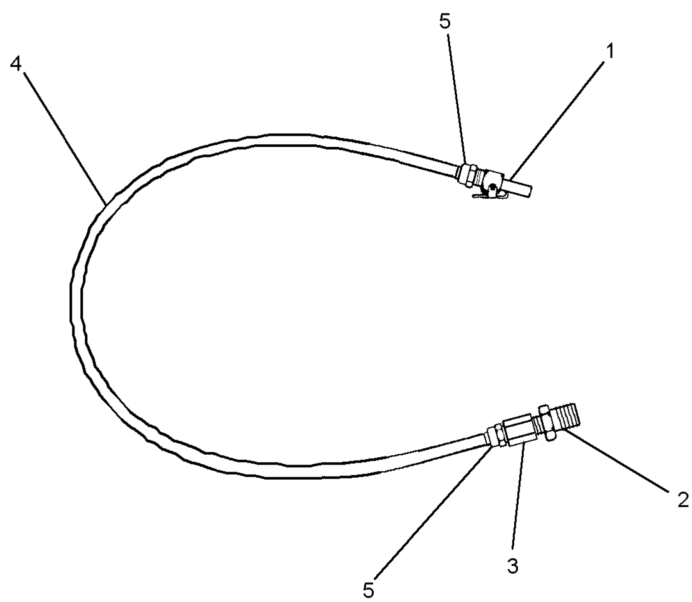


ADAPTER
VIEW A

1. #5 SLEEVE (MS20819-5J)
2. #5 B-NUT (AN818-5J)
3. 5/16 OD STAINLESS STEEL (MIL-T-6845-5)
4. #5 B-NUT (MS21921-5J)
5. STEEL SLEEVE (MS21922-5)

NOTE:

SOME ACTIVITIES MAY NEED TO BUILD AN ADAPTER WITH TWO FLARED ENDS IN ORDER TO HOOK UP TO N_2 INPUT CONNECTION (18)



LINE ASSEMBLY
VIEW B

1. QUICK DISCONNECT (F361-1339-1)
2. ADAPTER (AN816-5K) OR NIPPLE (ER816-5J)
   (DEPENDING ON P/N 2150 OR P/N 2170 BEING TESTED)
3. POLY FLO FEMALE CONNECTOR (266P1/4 IN X 1/8 IN) (266-P04 X 02)
4. 1/4 IN POLY FLO TUBING
5. POLY FLO NUT AND SLEEVE ASSEMBLY (261-P04)

013004

Figure 13-4. Adapter and Line Assembly

Table 13-2. Troubleshooting (External Leakage Test)

Trouble	Probable Cause	Remedy
C1, C2, C3, outlet, and filler ports leaking.	Adapters (12) loose, threads stripped or packing damaged.	Tighten adapter (12) or replace. Replace packing (15)
Hex plugs leaking	Adapters (10) loose, threads stripped or packing damaged.	Tighten adapter (10) or replace. Replace packing (11).

2. Remove caps from C1, C2, and C3 ports.

3. Connect adapter and line assembly (figure 13-4) from C3 port to 20 to 200 LEAKAGE connection (20) in altitude chamber. Turn INLET PRESS. ON/OFF valve to ON.

4. (Oxygen test stand model 1316AS100 only). Place overboard ON/OFF valve (T) to ON position.

5. Remove cap from manifold outlet port and connect manifold outlet port to N_2 INPUT connection (18) in altitude chamber.

6. Using LOW PRESS. regulator (N), slowly apply 50 psig to manifold outlet port, as indicated on N_2 inlet pressure gage (27). Observe OVERBOARD LEAKAGE rotameter (6). Maximum allowable leakage is 50 CCM. Record reading on Performance Test Sheet.

7. Back out (counterclockwise) on LOW PRESS. regulator (N) until spring tension is released.

8. Close altitude chamber door.

9. Using HIGH PRESS. regulator (Q), slowly apply 1000 psig to manifold outlet port, as indicated on REGULATED HIGH PRESS. gage (10). Observe OVERBOARD LEAKAGE rotameter (6). Maximum allowable leakage is 50 CCM. Record reading on Performance Test Sheet.

10. Turn HIGH PRESS. regulator (Q) to vent and open SYSTEM BLEED valve (S).

11. Open altitude chamber door.

12. Disconnect line from C3 port and connect to C2 port.

13. Repeat steps 5 through 11.

14. Disconnect line from C2 port and connect to C1 port.

15. Repeat steps 5 through 11.

16. Disconnect adapter and line assembly from 20 to 200 LEAKAGE connection (20) and manifold C1 port. Disconnect manifold outlet port from N_2 INPUT connection (18) in altitude chamber. Secure all test stand valves.

17. If leakage occurred during test, refer to troubleshooting (table 13-3). If no leakage was present, proceed to next test.

13-28. FILLER FLOW CHECK VALVE LEAKAGE TEST. To perform the Filler Flow Check Valve Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen Oil-free, Water Pumped, Type 1, Class 1, Grade B	A-A-59503 NIIN 01-028-9402

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter Assembly	Fabricate in IAW figure 13-4
1	Oxygen Systems Components Test Stand	1172AS100 or 1316AS100

1. Cap outlet port of manifold and check valve assembly.

2. Cap C1 and C2 ports.

3. Connect C3 port to N_2 INPUT connection (18) in altitude chamber.

4. Using adapter and line assembly (figure 13-4), connect filler port to 20 to 200 LEAKAGE connection (20) in altitude chamber.

Table 13-3. Troubleshooting (Outlet Flow Check Valve Leakage Test)

Trouble	Probable Cause	Remedy
C1, C2, and C3 ports have leakage in excess of 50 CCM.	Upper/lower seats (2) dirty or damaged. Packing (4) damaged	Clean or replace seats (2). Replace packing (4).
	Ball (5) dirty or Damaged.	Clean or replace ball (5).

5. Position manifold check valve assembly in altitude chamber and close door.

6. Turn INLET PRESS. ON/OFF valve (L) to ON.

7. Using LOW PRESS. regulator (N), slowly apply 50 psig to manifold C3 port, as indicated on N_2 inlet pressure gage (27).

8. Observe OVERBOARD LEAKAGE rotameter (6). Maximum allowable leakage is 50 CCM. Record reading on Performance Test Sheet.

9. Back out (counterclockwise) on LOW PRESS. regulator (N) until spring tension is released.

10. Using HIGH PRESS. regulator (Q), slowly apply 1000 psig to manifold C3 port, as indicated on REGULATED HIGH PRESS. gage (10).

11. Observe OVERBOARD LEAKAGE rotameter (6). Maximum allowable leakage is 50 CCM. Record reading on Performance Test Sheet.

12. Turn HIGH PRESS. regulator (Q) to vent and open SYSTEM BLEED valve (S) and bleed pressure from regulated high pressure system close SYSTEM BLEED valve (S).

13. Open altitude chamber door.

14. Disconnect C3 port from N_2 INPUT connection (18).

15. Remove cap from C2 port and connect to N_2 INPUT connection (18).

16. Cap C3 port and reposition manifold in altitude chamber.

17. Close altitude chamber door.

18. Repeat steps 4 through 13.

19. Open altitude chamber door.

20. Disconnect C2 port from N_2 INPUT connection (18).

21. Remove cap from C1 port and connect to N_2 INPUT connection (18).

22. Cap C2 port and reposition manifold in altitude chamber.

23. Repeat steps 4 through 13.

24. Open altitude chamber door.

25. Disconnect adapter and line assembly from 20 to 200 LEAKAGE connection (20) and manifold C1 port. Disconnect manifold filler port from N_2 INPUT connection (18) in altitude chamber. Secure all test stand valves.

26. If leakage occurred during test, refer to troubleshooting (table 13-4). If no leakage was present, proceed to next test.

13-29. CHECK VALVE AND OUTLET FLOW TEST. To perform the Check Valve and Outlet Flow Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen Oil-free, Water Pumped, Type 1, Class 1, Grade B	A-A-59503 NIIN 01-028-9402

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen Systems Components Test Stand	1172AS100 or 1316AS100

Table 13-4. Troubleshooting (Filler Flow Check Valve Leakage Test)

Trouble	Probable Cause	Remedy
C1, C2, and C3 ports have leakage in excess of 50 CCM.	Upper/lower seats (2) dirty or damaged. Packing (4) damaged.	Clean or replace seats (2). Replace packing (4).
	Ball (5) dirty or damaged.	Clean or replace ball (5).

1. Connect N_2 Regulator Model 8-250 or equivalent to outside source of high pressure nitrogen supply, other than test stand.

2. Cap manifold C2, C3, and outlet port.

3. Connect manifold filler port to outside source of high pressure nitrogen.

4. Connect manifold C1 port to N_2 INPUT connection (18) in altitude chamber and position manifold assembly in altitude chamber.

5. Turn INLET PRESS. ON/OFF valve (L) to ON and place FLOW SELECTOR valve (M) in the SUIT SIMULATOR position.

6. Open cylinder supplying outside source of nitrogen.

7. Using Nitrogen Regulator Model 8-250, slowly apply 140 psig to manifold assembly as indicated on nitrogen supply gage and N_2 INPUT PRESS. gage (27) in altitude chamber.

NOTE

When performing step 8, ensure 140 psig is maintained on nitrogen supply output gage.

8. Slowly open VENT PRESS. valve (H) until the equivalent of 50 lpm is indicated on VENT FLOW manometer (3).

9. Record reading from N2 INPUT PRESS. gage (27) on Performance Test Sheet. Nitrogen supply output gage and N_2 INPUT PRESS. gage shall not differ more than 20 psig, Close VENT PRESS. valve (H).

10. Back out (counterclockwise) on Nitrogen Regulator Model 8-250 until spring tension is released. Open VENT PRESS. valve (H) until no pressure is indicated on N_2 INPUT PRESS. gage (27) and nitrogen regulator supply gage. Close VENT PRESS. valve (H).

11. Disconnect manifold C1 port from N_2 INPUT connection (18).

12. Uncap manifold C2 port and cap manifold C1 port. Connect manifold C2 port to N_2 INPUT connection (18). Position manifold assembly in altitude chamber.

13. Repeat steps 7 through 10.

14. Disconnect manifold C2 port from N_2 INPUT connection (18).

15. Uncap manifold C3 port and cap manifold C2 port. Connect manifold C3 port to N_2 INPUT connection (18). Position manifold assembly in altitude chamber.

16. Repeat steps 7 through 10.

17. Disconnect manifold C3 port from N_2 INPUT connection (18).

18. Uncap manifold outlet port and cap manifold C3 port. Connect manifold outlet port to N_2 INPUT connection (18). Position manifold assembly in altitude chamber.

19. Repeat steps 7 through 10.

20. Close nitrogen supply cylinder.

21. Disconnect manifold outlet port from N_2 INPUT connection (18) and nitrogen supply cylinder.

22. Secure all test stand valves.

23. Uncap manifold C1, C2, and C3 ports.

24. If manifold failed Check Valve and Outlet Flow Test, refer to troubleshooting (table 13-5). Proceed to Oxygen Purge.

Table 13-5. Troubleshooting (Check Valve and Outlet Flow Test)

Trouble	Probable Cause	Remedy
Pressure drop between gages exceeds 20 psig.	C1, C2, C3, Filler or Outlet fittings (12) blocked.	Clean Adapter fittings (12).

13-30. OXYGEN PURGE.

13-31. To perform the Oxygen Purge, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Aviator's Breathing Oxygen, Type 1	MIL-O-27210

WARNING

Do not use test stand for oxygen purge.

1. Connect manifold assembly filler port to regulated high pressure oxygen source.

2. Purge manifold assembly with 200 psig flow of oxygen for 3 minutes.

3. Secure high pressure oxygen and disconnect manifold assembly.

13-32. DISASSEMBLY.

13-33. To disassemble the high pressure oxygen manifold and check valve assembly, use index numbers assigned to figure 13-7 unless otherwise noted. The manifold and check valve assembly must be completely disassembled each time a repair action is required to ensure the assembly is free of dirt, grease and other hydrocarbons. Disassemble the manifold and check valve assembly as follows:

NOTE

Special tools shall be requisitioned directly from the manufacturer Carleton Technologies (CAGE 04577), or obtain commercial eqivalent.

Materials Required

Quantity	Description	Reference Number
As Required	Cloth, Lint-Free, Type II	MIL-C-85043
As Required	Material, Rubber	—

Support Equipment Required

Quantity	Description	Reference Number
1	Special Tool, Retainer	B45322-1 Open Purchase, Carleton Technologies
1	Tool, Seat Removal	Fabricate IAW fig 13-5 (Note 1)
1	Punch, Drive Pin	NIIN 00-223-1014
As Required	Heat Shrink 11/64 in. dia.	—

Notes: 1. To assemble the Seat Removal tool, proceed as follows: Using approximately 1 inch of small diameter heat shrink, slide heat shrink over end of the drive punch using heat gun, heat the heat shrink ensuring it grasps the shaft firmly. Repeat process until the outer diameter of the heat shrink measures approximately 0.176 of an inch.

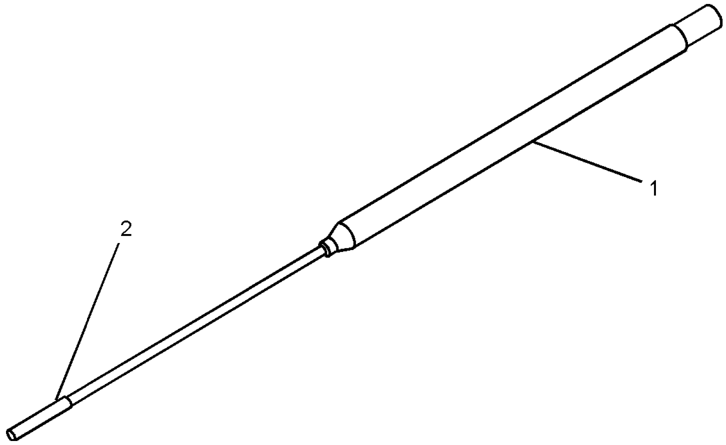


Figure 13-5. Special Tools

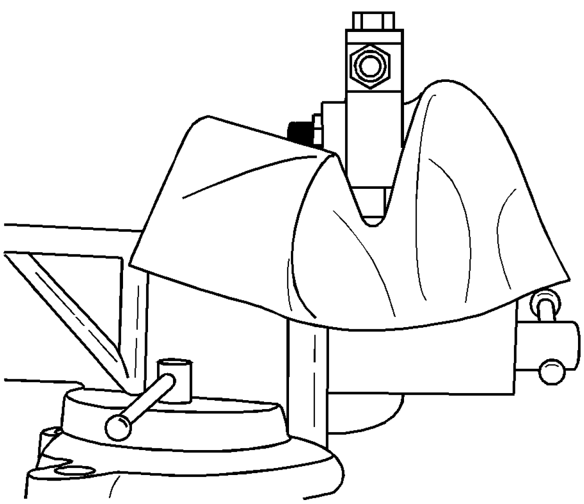


Figure 13-6. Installing Manifold and Check Valve Assembly in Vise

CAUTION

All disassembly, inspection, repair, and assembly must be done on benches having good lighting and in an area provided with air conditioning. Walls, floors, and ceiling should have a smooth finish and should be painted with a non chalking paint which can be kept clean and dust free. If manifold assembly is not going to be reassembled immediately after inspection and cleaning, stow all component parts in a plastic bag to protect from contaminants and moisture.

NOTE

Discard all O-rings removed during disassembly.

1. Carefully position the manifold assembly (1) into the vise with the two flat sides of the filler section mating the jaws of the vise and the hex head plugs (11) pointing up.

CAUTION

When performing step 2, wrap the two flat surfaces of the manifold assembly with material such as cloth or rubber material to protect the manifold body from damage when installing in vise (figure 13-6).

2. Remove adapter fittings (12) from filler, outlet, C1, C2, and C3 ports.

3. Using the hex socket wrench attachment remove filter retainers (15) and filters (14) from filler, outlet, C1, C2, and C3 adapter fittings (12).

4. Loosen hex head plugs (10) but do not remove on C1, C2, and C3 ports.

5. Remove manifold assembly (1) from vise.

6. Remove hex head plugs (10) on C1, C2, and C3 ports.

7. Using retainer tool remove upper retainer (9) from C1, C2, and C3 ports.

8. Holding your hand over C1, C2, and C3 ports, invert the manifold assembly to remove the ball (5) from C1, C2, and C3 ports.

9. Using seat tool remove the upper seat (8) from C1, C2, and C3 ports and discard.

10. Holding your hand over C1, C2, and C3 ports, invert the manifold assembly to remove sleeve (7), lower retainer (6) and ball (5) from C1, C2, and C3 ports.

11. Using seat tool remove the lower seat (2) from C1, C2, and C3 ports and discard.

NOTE

Older manifold assemblies may not have back-up rings (10A and 12A) installed.

12. Remove and discard back-up rings (10A) (if installed) and O-ring packing (11) from hex head plugs (10) and back-up rings (12A) (if installed) and O-ring packing (13) from filler, outlet, C1, C2, and C3 adapter fittings (12).

13-34. CLEANING.

13-35. To clean manifold and check valve assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Distilled Water	NIIN 00-35-4936
As Required	Soap, Liquid Ivory Dishwashing or Equivalent	Local Purchase
As Required	Nitrogen Oil-free, Water Pumped, Type 1, Class 1, Grade B	A-A-59503 NIIN 01-028-9402

NOTE

If your command has not received the materials and special equipment to perform the new oxygen cleaning procedures outlined in Chapter 4, utilize the Cleaning of Oxygen Lines paragraph for cleaning of metal parts of the manifold and check valve assembly.

1. Clean all metal parts using procedures outlined in Chapter 4.

2. Clean all O-ring packing using distilled water and blow dry with clean, oil-free water pumped nitrogen.

13-36. LUBRICATION.

13-37. Lubricate O-ring packings with a light film of Krytox 240 AC or equivalent.

13-38. ASSEMBLY.

13-39. To assemble manifold and check valve assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Krytox 240 AC Lubricant	NIIN 00-961-8995 (CAGE 73925)

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Torque, 300 in-lb.	TE25A NIIN 00-776-1841
1	Hex Socket Wrench Attachment	NIIN 00-596-8508
1	Special Tool, Retainer Removal	B45322-1 Open Purchase, Carleton Technologies
1	Tool, Seat Removal	Fabricate IAW fig 13-5

NOTE

Index numbers in parentheses refer to figure 13-7 unless otherwise noted.

1. Install back-up rings (10A), then O-ring packings (11) on hex head plugs (10). Install back-up rings (12A), then O-ring packings (13) on filler, outlet, C1, C2, and C3 adapter fittings (12).

2. Using seat tool install the lower seat (2) ensuring O-ring is facing up and back-up ring is facing down into C1, C2, and C3 ports.

3. Install ball (5) into C1, C2, and C3 ports.

4. Install lower retainer (6) into C1, C2, and C3 ports ensuring the four small holes of the lower retainer (6) are facing up.

5. Install sleeve (7) into C1, C2, and C3 ports ensuring the smaller diameter hole of the sleeve (7) is facing up.

6. Using seat tool, install the upper seat (8) ensuring O-ring is facing down and back-up ring is facing up in C1, C2, and C3 ports.

7. Install ball (5) into C1, C2, and C3 ports.

8. Using retainer tool, install upper retainer (9) into C1, C2, and C3 ports ensuring the four small holes of the upper retainer are facing up.

9. Using special tool, torque three upper retainers (9) to 80 in-lb.

10. Install hex head plugs (10) on C1, C2, and C3 ports.

11. Torque three hex plugs (10) 300 in-lb.

12. Install filters (14) and filter retainers (15) into filler, outlet, C1, C2, and C3 adapter fittings (12).

13. Torque five filter retainers (15) to 170 in-lb.

14. Install filler, outlet, C1, C2, and C3 adapter fittings (12).

15. Torque five adapter fittings (12) to 300 in-lb.

Section 13-5. Illustrated Parts Breakdown

13-40. GENERAL.

13-41. This section lists and illustrates the assemblies and detail parts of the High Pressure Oxygen Manifold Assembly (P/N B40831-1) manufactured by Carleton Technologies, Inc.

13-42. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

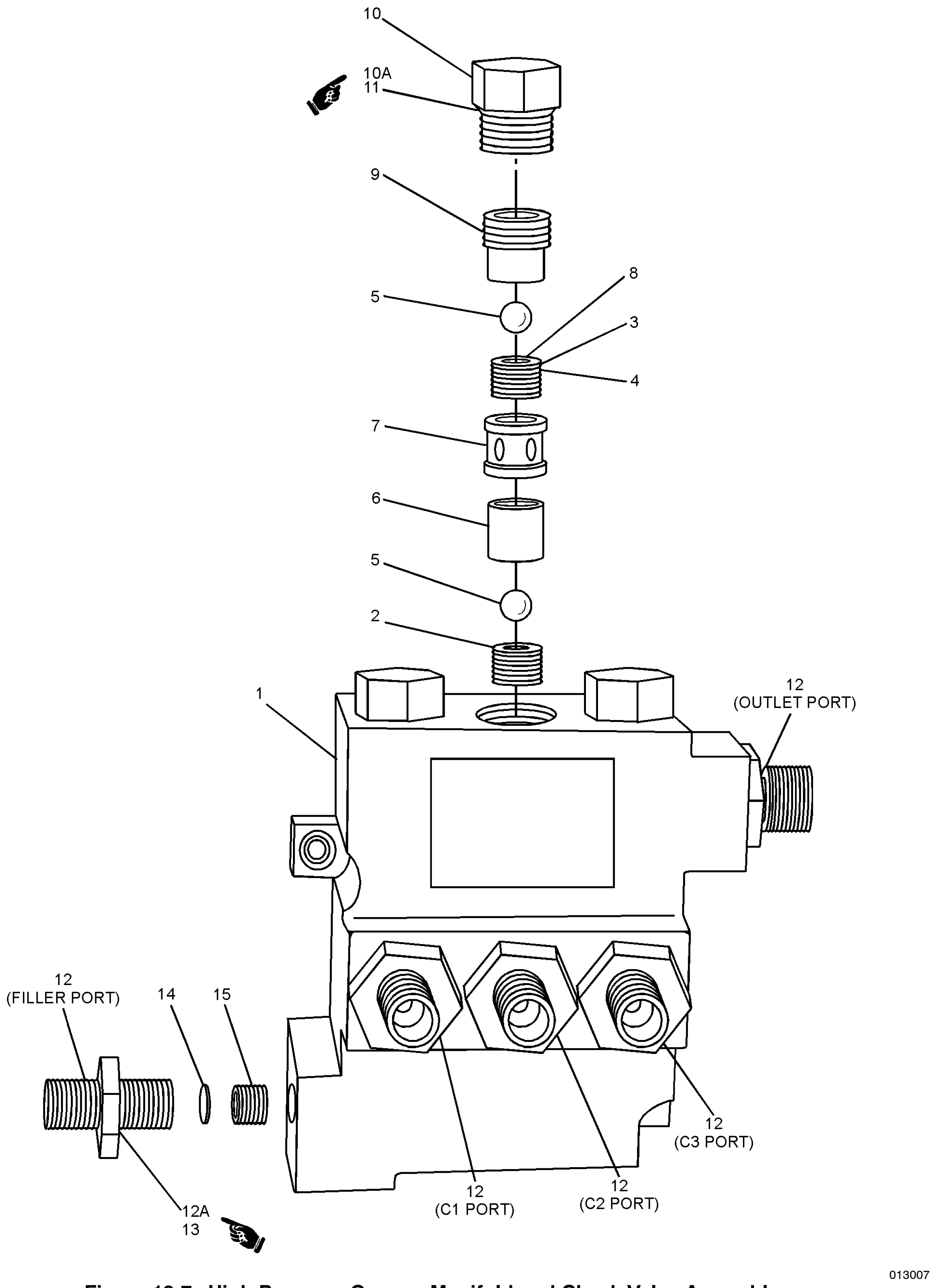


Figure 13-7. High Pressure Oxygen Manifold and Check Valve Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
13-7	B40831-1	VALVE ASSEMBLY, High Pressure Oxygen Manifold and Check	REF	
-1	B40832-1	. BODY	1	
-2	B40836-1	. SEAT, Lower (KD)	3	
-3	1002-0030-011	. RING, Back-up (KD)	6	
-4	MS9068-011	. PACKING (KD)	6	
-5	MS19064-10007	. BALL (KD)	6	
-6	B40837-1	. RETAINER, Lower	3	
-7	B40838-1	. SLEEVE	3	
-8	B40839-1	. SEAT, Upper (KD)	3	
-9	B40840-1	. RETAINER, Upper	3	
-10	MS51840-25SS	. PLUG, Hex Head	3	
-10A	B42852-2	. RING, Back-up (KD)	3	
-11	M25988/1-906	. PACKING (KD)	3	
-12	B40833-1	. FITTING, Adapter	5	
-12A	B42852-1	. RING, Back-up (KD)	5	
-13	M25988/1-905	. PACKING (KD)	5	
-14	B40834-1	. FILTER (KD)	5	
-15	B40835-1	. RETAINER, Filter	5	
-16	B42494-1	PARTS KIT, Monel Manifold	REF	

NUMERICAL INDEX

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CHAPTER 14

PORTABLE OXYGEN SYSTEM
P/N 1520

Section 14-1. Description

14-1. GENERAL.

14-2. The Portable Oxygen System is manufactured by Fluid Power Inc. (CAGE 99227) (figure 14-1). Table 14-1 contains the leading particulars for the portable oxygen system.

14-3. CONFIGURATION.

14-4. The Portable Oxygen System is supplied in one basic configuration that is composed of a 96 cubic inch high pressure oxygen cylinder, oxygen regulator, delivery hose, filler line and one way charging check valve assembly, with supporting unit frame and strap assembly.

14-5. FUNCTION.

14-6. Supply oxygen pressure of 2,000 psig is stored in the 96 cubic inch oxygen cylinder. When the oxygen cylinder handwheel valve is turned off, "0" pressure will be indicated on the oxygen regulator pressure gage. When the oxygen cylinder handwheel valve is turned counterclockwise to the open position, cylinder supply will be indicated on the oxygen regulator pressure gage up to 2000 psig. Steps 1 through 8 explain the operation of the oxygen regulator (figure 14-2).

1. Oxygen from the supply cylinder enters the regulator through the adapter assembly and exerts pressure against the inlet valve, permitting oxygen to flow from the oxygen inlet orifice through the inlet valve and into the pressure reducer chamber which is the area around the pressure reducer.

2. Expansion and contraction of the bellows assembly operates the pressure reducer lever which controls the inlet and reduces cylinder pressure from 1800 pounds to 49 ± 1 psig. When the chamber pressure reaches 49 ± 1 psig, the bellows contracts, causing the pressure reducer lever to push the inlet valve up against the oxygen inlet orifice and shut off the flow of oxygen.

Table 14-1. Leading Particulars

Part Number	1520
Federal Stock Number (FSN)	RH1660-650-1711-Y120
Operating Altitude Range:	
Air-Oxygen Mixture	Up to 32,000 ft
100 Percent Oxygen	Over 32,000 ft
Visual Indications	High pressure oxygen gage and oxygen flow indicator
Regulator Controls:	
Diluter Lever	To select NORMAL OXYGEN or 100% OXYGEN
Cylinder Valve	Opens and closes oxygen supply
Emergency Valve	For emergency use
Overall Dimensions:	
Weight (Approximate)	11.3 pounds
Height (Overall)	16 3/4 inches
Width (Overall)	6 5/8 inches

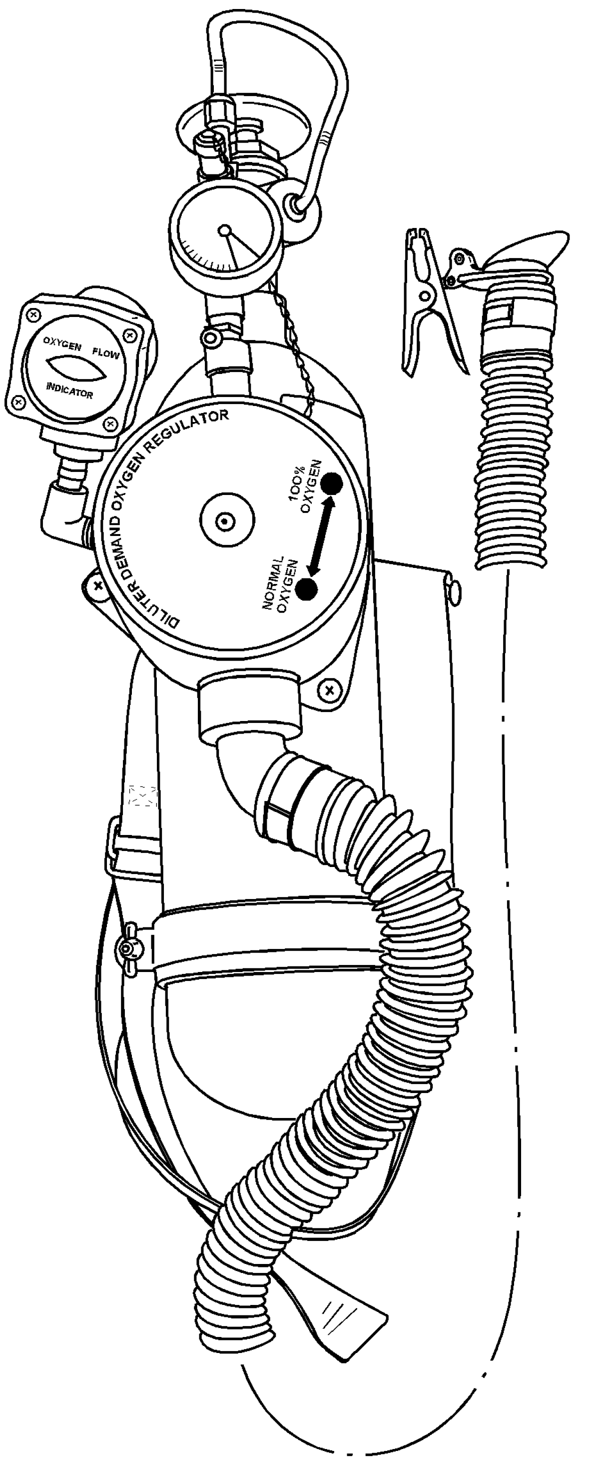


Figure 14-1. Portable Oxygen System

3. Relief valve assembly covers the top of the pressure reducer chamber. It acts as a safety valve to prevent excessive pressure from building up within, if a malfunction should occur in the pressure reducer assembly. When pressure in the reducer chamber reaches 65 to 160 psig, the valve seat unseats and relieves excessive pressure.

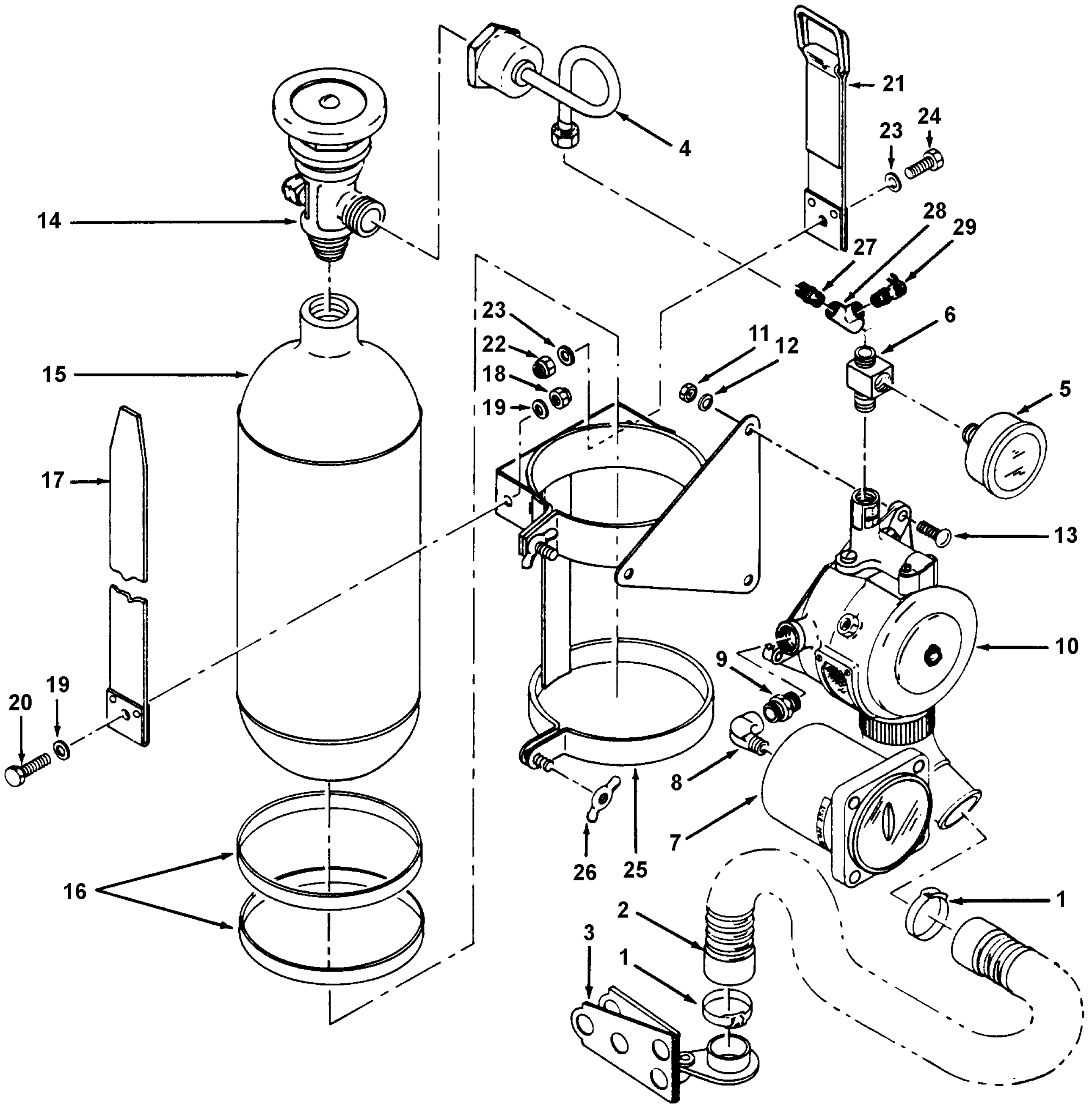
4. Oxygen flows from the pressure reducer chamber into the lower half of the demand valve chamber. The demand valve is controlled by diaphragm which, in turn, is controlled by the person using the regulator. The center of the diaphragm is attached to the diaphragm lever by means of diaphragm knob and diaphragm link. When the individual inhales, the diaphragm moves toward the demand valve which in turn causes the diaphragm lever to drop. When the diaphragm lever drops, pressure is exerted on the demand valve stem which, in turn, opens the demand valve permitting oxygen to enter the upper half of the demand valve chamber. Oxygen then passes through the hole in the upper part of the demand valve chamber and into the injector assembly. When the user exhales, the diaphragm moves away from the demand valve, thus raising the diaphragm lever and releasing pressure on the demand valve stem, thereby closing the demand valve.

NOTE

If desired, either to check the operation of the regulator or to quickly obtain a continuous oxygen flow, the diaphragm knob can be depressed by hand. This position will keep the demand valve open as long as the knob is depressed.

5. When air valve lever (N) is turned counterclockwise, the air valve cover and air valve body separate slightly, exposing two screen inlets, at the air valve entrance. Inside air valve is an aneroid assembly which is sensitive to changes in atmospheric pressure. At sea level the aneroid contracts, permitting air to pass around the aneroid, unseat the air check valve disc and enter the chamber when there is sufficient suction buildup caused by inhalation. As higher altitudes are reached, decreasing atmospheric pressure allows the aneroid to expand, gradually forcing the throttling plate against the valve seat and eventually shutting off the outside air flow into the chamber. This action occurs between 28,000 and 32,000 feet. Air admitted to the air chamber flows into the injector assembly. Should the user desire 100% oxygen prior to the aneroid expanding and cutting off outside air, turn the air valve lever clockwise and this action will shut off all outside air.

6. The air check valve, which closes when the regulator user exhales, is part of the check valve and aneroid assembly. This assembly prevents the escape of oxygen. It also prevents any flow of air until a definite suction is built up so the air-oxygen mixture will be the correct ratio for low flows.



1.	HOSE CLAMPS	11.	NUT	21.	STRAP ASSY
2.	TUBE	12.	WASHER	22.	NUT
3.	CONNECTOR ASSY	13.	SCREW	23.	WASHER
4.	LINE ASSY	14.	VALVE	24.	SCREW
5.	GAUGE	15.	OXYGEN CYLINDER	25.	SUPPORT BRACKET ASSY
6.	FITTING	16.	CYLINDER BAND	26.	NUT
7.	OXYGEN FLOW INDICATOR	17.	STRAP ASSY	27.	NIPPLE
8.	ELBOW	18.	NUT	28.	TEE
9.	NIPPLE	19.	WASHER	29.	CHARGING CHECK VALVE ASSY
10.	OXYGEN REGULATOR	20.	SCREW		

014002

Figure 14-2. Portable Oxygen System, Exploded View

7. Oxygen from the demand valve flows into the injector assembly. As it leaves the injector nozzle, the air from the air valve mixes with it. Upon inhalation, of the mixture of air and oxygen is drawn through the venturi. The venturi delivers an air-oxygen mixture through the elbow assembly to the oxygen mask.

8. The injector assembly is adapted to handle large quantities of oxygen under unusual conditions. The nozzle in the injector housing forms a valve with the injector seat. For high flows the nozzle unseats itself and releases a greater quantity of oxygen through the holes in the lower portion of the injector housing.

14-7. SERVICE LIFE.

14-8. The Portable Oxygen System regulator shall remain in service as long as repair cost does not exceed 75% of the cost of the regulator. The 96 cubic inch oxygen cylinder falls under the Department of Transportation (D.O.T.) regulation and must be removed from service every 5 years for hydrostatic testing. The D.O.T. number (example: ICC 3AA) and the latest hydrostatic test date (example: 12/98) will be permanently stamped in the neck of the cylinder.

14-9. REFERENCE NUMBERS, ITEMS, AND SUPPLY DATA.

14-10. Section 14-4, Illustrated Parts Breakdown, contains information on each assembly, subassembly and component part of the Portable Oxygen System. The figure and index number, reference or part number, description and units per assembly are provided with the breakdown.

Section 14-2. Modifications

14-11. GENERAL.

14-12. No modifications to the Portable Oxygen System are required or authorized at this time.

Section 14-3. Maintenance

14-13. GENERAL.

14-14. This section contains procedural steps for inspection, testing, disassembly, cleaning, repair and assembly of the Portable Oxygen System.

14-15. Procedural steps outlined in this section are listed as they are required, and in the sequence in which they occur.

NOTE

The Portable Oxygen System shall be considered beyond economical repair when cost of repair parts exceeds 75% of the cost of the Portable Oxygen System.

Upon completion of any maintenance action (e.g. inspection, repair, modification, etc.), be sure to make necessary entries on appropriate forms in accordance with OPNAVINST 4790.2 Series.

14-16. INSPECTION.

14-17. SPECIAL INSPECTION. The Special Inspection consists of a visual inspection (paragraph 14-19) and functional test (paragraph 14-21) of the Portable Oxygen System. The Special Inspection is performed in conjunction with the aircraft inspection requirements for the aircraft in which the Portable Oxygen System is installed.

14-18. CALENDAR INSPECTION. The Calendar Inspection shall be conducted on the Portable Oxygen System every 448 days. The Calendar Inspection consists of the following:

1. Disassembly (paragraph 14-27).

2. Cleaning (paragraph 14-29).

3. Repair (paragraph 14-31).

4. Bench Test of Oxygen Regulator (paragraph 14-22).

5. Visual Inspection (paragraph 14-19).

6. Assembly (paragraph 14-34).

7. Charging Oxygen Cylinder (paragraph 14-25).

8. Functional Test (paragraph 14-21).

14-19. VISUAL INSPECTION. To perform the Visual Inspection, proceed as follows:

NOTE

To assist in keeping track of the 96 cubic inch oxygen cylinders that are coming due for hydrostatic testing, it is highly recommended that local serial numbers be assigned and stenciled on the main body of the cylinder. Keep records of that cylinder using local assigned serial numbers, aircraft BUNO installed on and hydrostatic test date due.

Index numbers refer to figure 14-2 unless otherwise noted.

1. Inspect oxygen regulator legibility of all markings, for good condition and security of attachment.

2. Inspect support bracket (28) for cracks, dents, and security of attachment.

3. Inspect oxygen hose assembly (3) for cut, tears, fraying, dry rot of rubber and security of clamps (2) and oxygen connector (4).

4. Inspect short strap assembly (24) and long strap assembly (20) for cuts, tears, fraying, good condition and security of attachment machine bolts (23 and 27), washers (22 and 26) and nuts (21 and 25).

5. Inspect cylinder valve assembly (15) for good condition.

6. Inspect oxygen cylinder (17) condition and in service hydrostatic test date stamped in neck of cylinder.

7. Inspect charging check valve assembly (32) for good condition and security of attachment.

8. Inspect tee (31) for cracks and good condition.

9. Inspect nipple (30), and line (5) for good condition and security of attachment.

10. Replace all defective parts.

14-20. TESTING.

14-21. FUNCTIONAL TEST. To perform the functional test on the Portable Oxygen System, proceed as follows:

NOTE

Index numbers refer to figure 14-2 unless otherwise noted.

1. Ensure oxygen regulator (11) diluter knob is in the 100% position.

2. Turn oxygen cylinder valve assembly (15) to the full open position. Oxygen regulator (11) pressure gage should indicate between 1800 to 2000 psig. There should be no flow out of oxygen connector (4).

3. Slightly depress the diaphragm knob (located on top center) of oxygen regulator (11). There should be a flow out of oxygen connector (4).

4. Release the diaphragm knob. There should be no flow out of oxygen connector (4).

5. Turn oxygen cylinder valve assembly (15) to full off position.

6. Depress diaphragm knob to deplete pressure from oxygen regulator (11), then release oxygen regulator (11) diaphragm knob.

7. If portable oxygen system fails functional test, replace with RFI unit.

8. Charge or top off portable oxygen system in accordance with paragraph 14-25, as necessary.

14-22. BENCH TEST OXYGEN REGULATOR. Forward oxygen regulator to AIMD or MALS for bench test in accordance with NAVAIR 13-1-6.4-2.

14-23. STORAGE.

14-24. STORAGE OF PORTABLE OXYGEN SYSTEM ABOARD THE AIRCRAFT. Figure 14-3 shows typical storage aboard the aircraft.

14-25. CHARGING.

14-26. To charge the Portable Oxygen System, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Oxygen, Aviator's Breathing	MIL-O-27210, Type 1

014003

Figure 14-3. Typical Storage of Portable Oxygen System on Aircraft

NOTE

Personnel operating oxygen recharge spin cart should be thoroughly familiar with all valves and controls. Prior to operating, refer to appropriate ground support equipment manual and servicing placard on spin cart for recharging operation procedures. Personnel operating oxygen spin cart shall be licensed in accordance with OPNAVINST 4790.2 Series.

Index numbers refer to figure 14-2 unless otherwise noted.

1. Disconnect dust cap from charging check valve assembly (32).

2. Connect servicing line from oxygen spin cart.

3. Turn cylinder valve assembly (15) to full open position.

NOTE

During filling operation, Portable Oxygen System servicing pressure will be indicated on oxygen regulator (11) pressure gage.

4. Using oxygen spin cart, fill the Portable Oxygen System to 1800 to 2000 psig in stages outlined in table 14-2. Fill time for each stage is a minimum of 3 minutes with a 2 minute cool down period.

5. Shut down and secure oxygen spin cart.

6. Turn Portable Oxygen System cylinder valve assembly (15) to full off position.

7. Depress oxygen regulator (11) diaphragm knob to bleed pressure from Portable Oxygen System.

8. Disconnect oxygen spin cart servicing line from Portable Oxygen System charging check valve assembly (32).

9. Install dust cap on to Portable Oxygen System charging check valve assembly (32).

14-27. DISASSEMBLY.

14-28. To disassemble the Portable Oxygen System, proceed as follows:

WARNING

Prior to disassembly, ensure oxygen cylinder valve (15) is in fully closed position. Depress oxygen regulator (11) diaphragm knob to bleed pressure from system, then release oxygen regulator (11) diaphragm knob.

NOTE

Index numbers refer to figure 14-5 unless otherwise noted.

Disassemble the Portable Oxygen System only as far as necessary to perform a repair action or a specific maintenance function.

1. Remove cap and chain from charging check valve assembly (32) and remove charging check valve assembly (32) from tee (31).

Table 14-2. Cylinder Filling Stages

STAGE	PSIG
1	0-500
2	500-1000
3	1000-1500
4	1500-1800
5	1800-2000

AMBIENT AIR TEMPERATURE		CHARGING PRESSURE
°F	°C	PSIG
0	-18	1550-1750
10	-12	1600-1775
20	-7	1625-1800
30	-1	1675-1850
40	5	1700-1875
50	10	1725-1925
60	16	1775-1975
70	21	1800-2000
80	27	1825-2050
90	32	1875-2075
100	38	1900-2125
110	43	1925-2150
120	49	1975-2200
130	54	2000-2225

2. Disconnect line assembly (5) from cylinder valve assembly (15).

3. Disconnect line assembly (5) from nipple (30).

4. Remove nipple (30) and tee (31) from gauge fitting (7).

5. Remove oxygen regulator assembly (11) from support bracket assembly (28) by removing three screws (14), washers (13), and nuts (12).

6. Remove hose assembly (3) from oxygen regulator assembly (11) outlet by loosening clamp (2).

7. Remove oxygen cylinder (17) and oxygen valve (16) as unit from support bracket assembly (28), by removing two wing nuts (29).

8. Remove long strap assembly (20) from support bracket assembly (28) by removing screw (23), two washer (22), and nut (21).

9. Remove short strap assembly (24) by removing screw (27), two washers (26), and nut (25).

10. Forward oxygen regulator assembly (11) to AIMD or MALS for bench test and repair.

14-29. CLEANING.

14-30. To clean the Portable Oxygen System parts, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Dishwashing Liquid, Ivory Liquid or Equivalent	Local Purchase
As Required	Cloth, Lint-Free	MIL-C-85043

NOTE

Do not clean oxygen cylinder (17) using NOC process. Clean external body of oxygen cylinder (17) in accordance with the procedure outlined in step 3 of this paragraph.

1. Clean oxygen line (5) in accordance with procedures outlined in NAVAIR 13-1-6.4-1.

2. Clean all metal parts (with exception of oxygen cylinder assembly (17)) in accordance with procedures outlined in NAVAIR 13-1-6.4-1.

3. Clean external body of oxygen cylinder assembly (17) by mixing 1 part Ivory liquid (or equivalent) to 5 parts water and wiping clean with a lint-free cloth. Wipe dry cylinder with a lint-free cloth.

14-31. REPAIR.

14-32. Repair of the Portable Oxygen System is limited to the fabrication of short strap (24) and long strap (20). All other defective components shall be replaced with new components. To fabricate new short strap (24) or long strap (20), proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Webbing, Nylon, 1 inch, Type XVII	MIL-W-4088 NIIN 00-260-6906
2	Ring, Metallic	MIL-R-3390 NIIN 00-202-0228
2	Grommet, Metallic Spur, Size O	NIIN 00-231-6582
As Required	Thread, Nylon, Size E	V-T-295 NIIN 00-616-0079

1. Fabricate short strap assembly (24) as per figure 14-4, view B.

2. Fabricate long strap assembly (20) as per figure 14-4, view A.

14-33. VISUAL INSPECTION. Perform Visual Inspection of disassembled parts in accordance with paragraph 14-19.

14-34. ASSEMBLY.

14-35. To assemble the portable oxygen system, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Leak, Detection, Compound, Type 1	MIL-L-25567
As Required	Tape, Anti-seize	MIL-T-27730A

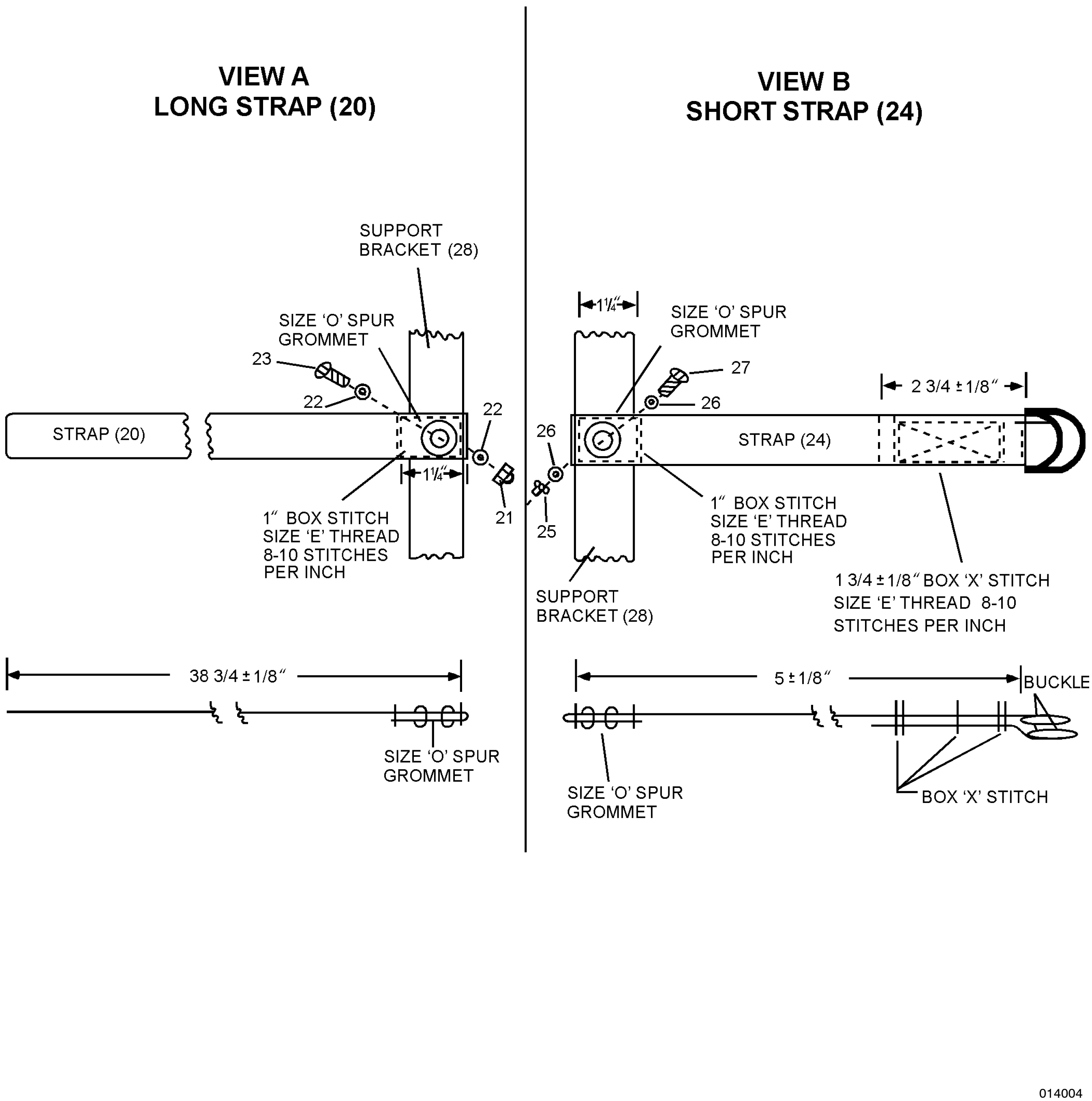


Figure 14-4. Short and Long Strap

NOTE

Index numbers refer to figure 14-5 unless otherwise noted.

1. Attach long strap assembly (20) to support bracket assembly (28) and secure with screw (23), two washers (22) and nut (21).

2. Attach short strap assembly (24) to support bracket assembly (28) and secure with screw (27), two washers (26) and nut (25).

3. Apply anti-seize tape to pipe threads gauge fitting (7), nipple (30) and charging check valve assembly (32).

4. Install one end of nipple (30) into tee (31) hand tight, then using a wrench tighten an additional one to two turns maximum.

5. Install nipple (30) and tee (31) onto gauge fitting (7) hand tight, then using a wrench tighten an additional one to two turns maximum.

6. Install charging check valve assembly (32) into tee (31) hand tight, then using a wrench tighten an additional one to two turns maximum. Install dust cap and chain on valve assembly (32).

7. Loosely attach line assembly (5) to nipple (30).

8. Attach oxygen regulator (11) with pressure facing up and outlet facing down to support bracket assembly (28) and secure with three screws (14), washers (13) and nuts (12).

9. Install two cylinder bands (18) onto oxygen cylinder (17).

10. Install oxygen cylinder (17) and oxygen valve assembly (15) into support bracket assembly (28) ensuring two cylinder bands are aligned support bracket (28) clamps and loosely secure with two wing nuts (29). Align oxygen valve assembly (15) with line assembly (5) and connect line assembly (5) to oxygen valve assembly (15). Tighten two wing nuts (29).

11. Tighten line assembly (5) at nipple (30) connection and oxygen valve assembly (15) connection.

12. Place clamp (2) onto hose assembly (3) and attach hose assembly (3) to oxygen regulator (11) outlet and secure with clamp (2).

13. If removed, place clamp (2) onto hose assembly (3), install oxygen connector assembly (4) into hose assembly (3) and secure with clamp (2).

14-36. POST ASSEMBLY TESTING. To perform Post Assembly Testing, proceed as follows:

1. Charge Portable Oxygen System in accordance with paragraph 14-25.

NOTE

When performing step 2, with Portable Oxygen System pressurized, using leak detection compound check for leakage at line assembly (5) connections and at tee (31) connections.

2. Perform functional test in accordance with paragraph 14-21.

Section 14-4. Illustrated Parts Breakdown

14-37. GENERAL.

14-38. This section lists and illustrates the assemblies and detail parts of the Portable Oxygen System manufactured by Fluid Power Inc. (CAGE 99227) Part No. 1520.

14-39. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

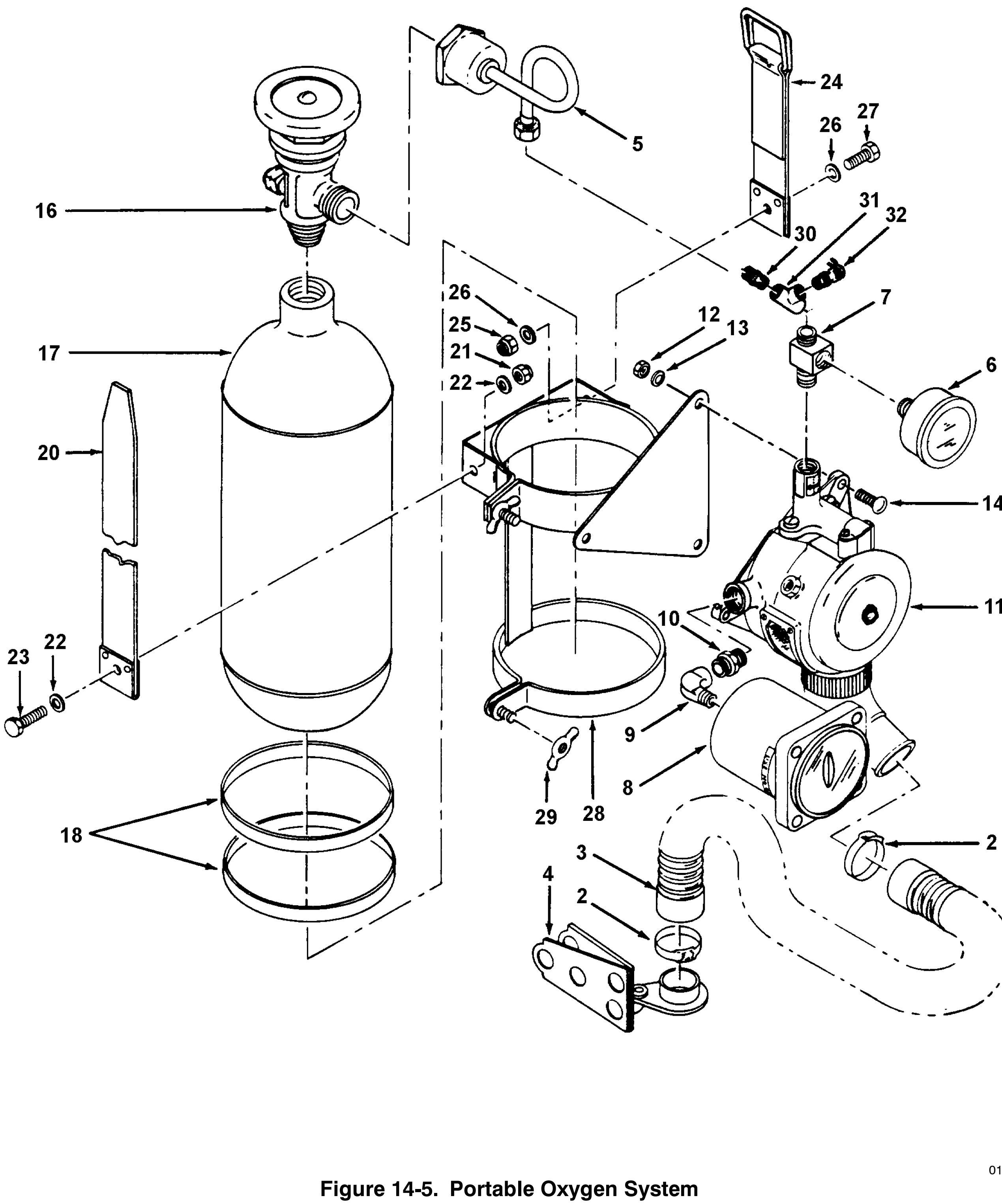


Figure 14-5. Portable Oxygen System

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
14-5	1520	DILUTER DEMAND UNIT (Note 1)	1	
-1	2495	. TUBE ASSEMBLY	1	
-2	A20728-18-1	. . CLAMP, Hose (78553) (Fluid Power . . . . Part No. 1382)	2	
-3	AN6003T36A	. . TUBE (Fluid Power Part No. 1386)	1	
-4	1385	. . CONNECTOR ASSEMBLY	1	
-5	1353	. LINE ASSEMBLY	1	
-6	2620	. GAUGE	1	
-7	1631	. FITTING, Gauge	1	
-8	1775	. INDICATOR, Oxygen flow	1	
-9	AN914-1	. ELBOW	1	
-10	AN911-1	. NIPPLE	1	
-11	1600	. REGULATOR, Oxygen, type A-12A . . . . (Note 2)	1	
	2858-A1	. REGULATOR, Oxygen (99251) (Note 2)	1	
	2858-A1A	. REGULATOR, Oxygen (99251) (Note 2)	1	
	2858-B1	. REGULATOR, Oxygen (99251) (Note 2)	1	
	2858-C1	. REGULATOR, Oxygen (99251) (Note 2) . . . . . . (ATTACHING PARTS)	1	
-12	AN315D3R	. NUT	3	
-13	AN935B10L	. WASHER	3	
-14	AN520DD10-8	. SCREW . . . . ---*---	3	
-15	1390	. CYLINDER AND VALVE ASSEMBLY	1	
-16	1361	. . VALVE, Oxygen cylinder	1	
-17	MS26545-A1X0096 MS26545-A2X0096	. . CYLINDER, Oxygen (Fluid Power . . . . Part No. 1395)	1	
-18	2733	. BAND, Cylinder	2	
-19	1525	. SUPPORT ASSEMBLY	1	
-20	1555	. . STRAP ASSEMBLY, Long . . . . (ATTACHING PARTS)	1	
-21	AN365-1032	. . NUT	1	
-22	AN960-10	. . WASHER	2	
-23	AN3-4	. . SCREW . . . . ---*---	1	
-24	1515	. . STRAP ASSEMBLY, Short . . . . (ATTACHING PARTS)	1	
-25	AN365-1032	. . NUT	1	
-26	AN960-10	. . WASHER	2	
-27	AN3-4	. . SCREW . . . . ---*---	1	
-28	1565	. . SUPPORT BRACKET ASSEMBLY	1	
-29	AN350-1032	. . NUT	2	
-30	AN911-1	. . NIPPLE, Pipe Thread (88044)	1	
-31	AN917-1	. . TEE, Internal Pipe thread (88044)	1	
-32	4215	. . CHECK VALVE ASSEMBLY, ... Charging (00-964-3294)	1	

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
Notes: 1. Most parts listed in IPB may not be stocked in supply system. For these parts, activities must order the parts open purchase from the following company: Fluid Power Inc. 1300 Hudson Gate Dr. P. O. Box 208 Hudson, Ohio 44236 TEL: (330) 653-5107 2. See NAVAIR 13-1-6.4-2 for IPB.				

NUMERICAL INDEX

CHAPTER 15

OXYGEN REGULATOR HOSE ASSEMBLIES

Section 15-1. Description

15-1. GENERAL.

15-2. The oxygen regulator hose assembly, in conjunction with the seat survival kit and man mounted oxygen regulator, provides an aircrewmember with both oxygen and communication capabilities (figure 15-1). The oxygen source can be either a Liquid Oxygen (LOX) system (figure 15-2) or an Onboard Oxygen Generating System (OBOGS) (figure 15-3).

15-3. CONFIGURATION.

15-4. The oxygen regulator hose assembly consists of a hose with fittings to connect between the oxygen regulator and the seat survival kit hose. The hose is fabricated of a NOMEX weave or rubberized material covering a flexible silicone or rubber hose that is wire wound for stability. At the lower end of the oxygen regulator hose is a quick disconnect fitting which connects to the seat survival kit hose. The communications cable is either internal or external depending on aircraft platform (table 15-1).

15-5. If failure occurs in the aircraft oxygen supply, or in case of high altitude or over water ejection, an emergency supply of oxygen will be provided by either manual or automatic actuation of the emergency oxygen cylinder located in the seat survival kit.

15-6. SUBASSEMBLIES OF OBOGS OXYGEN REGULATOR HOSE ASSEMBLIES. The major subassemblies of the OBOGS oxygen regulator hose assembly are:

1. Oxygen Regulator Hose Assembly, MBEU147722-1

   a. Cable/Keeper Assembly, MBEU148019

   b. Oxygen Regulator Hose Subassembly, MBEU148020

2. Oxygen Regulator Hose Assembly, 57012-3

   a. Cable/Keeper Assembly, 57012-3-1

   b. Oxygen Regulator Hose Subassembly, 57012-3-2

Table 15-1. Oxygen Regulator Hose Assembly Part Numbers and Application

Part Number	Aircraft Platform	OBOGS/LOX	Internal or External	Communicational Cord
REDAR-A10116-2	EA-6B, F-4, F-14A/B, F/A-18A/B/C/D, S-3, T-2	LOX	Internal	
57012-3	F-14D, F/A-18C/D, T-45/A, AV-8B (NACES equipped)	OBOGS	External	
REDAR-A11206-2	F-14D, F/A-18C/D, T-45/A, AV-8B (NACES equipped)	OBOGS	Internal	

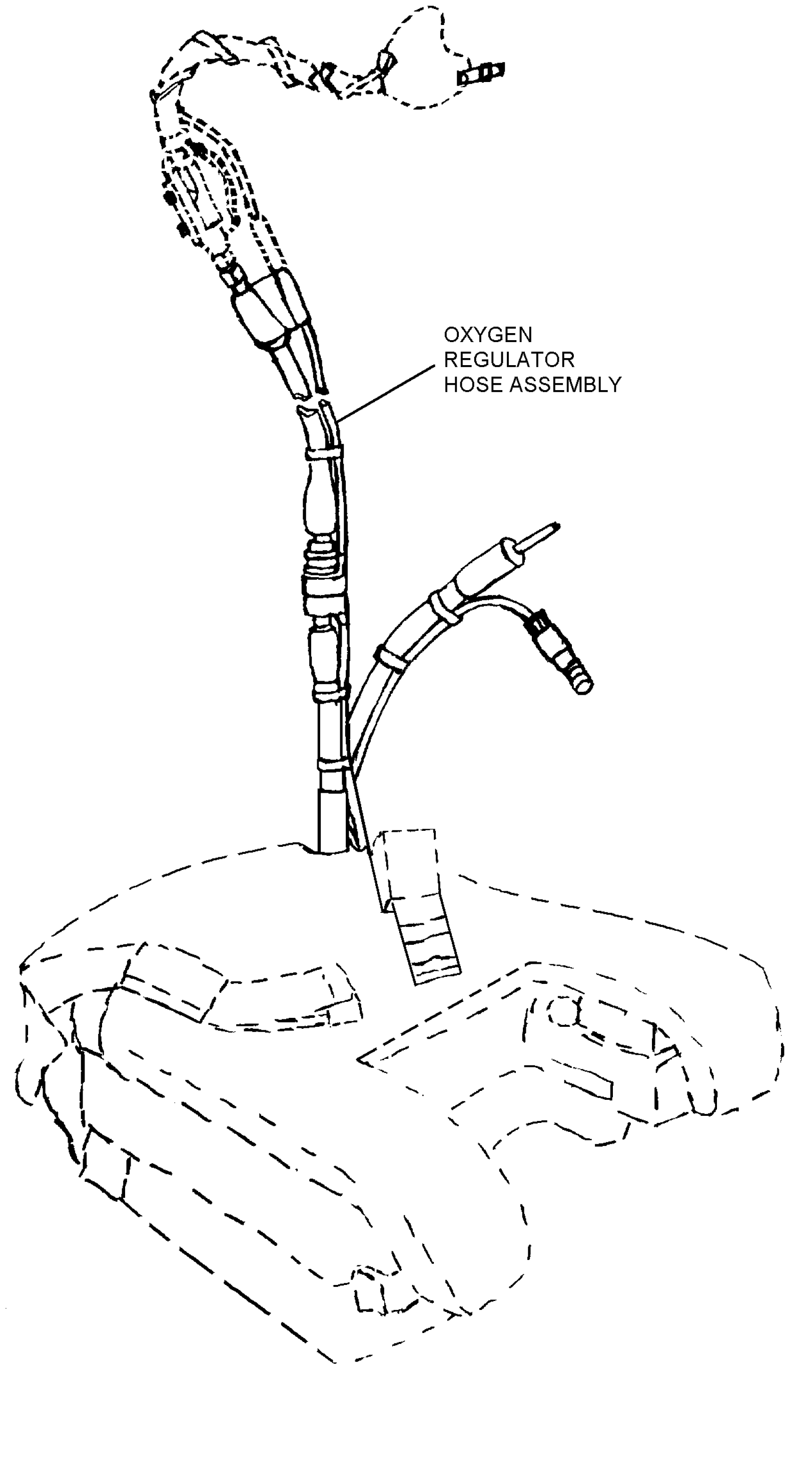


Figure 15-1. Oxygen Regulator Hose Assemblies Configuration (Typical)

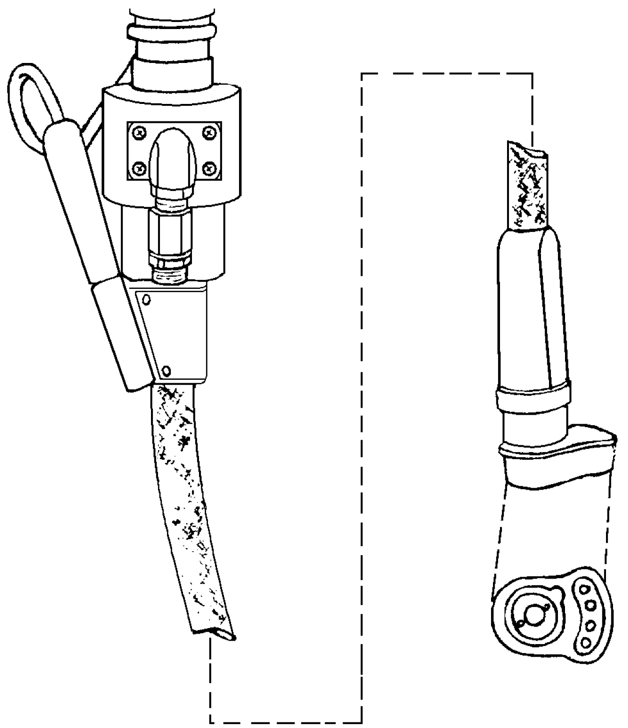


Figure 15-2. Oxygen Regulator Hose Assembly (Typical. Used for Liquid Oxygen Only)

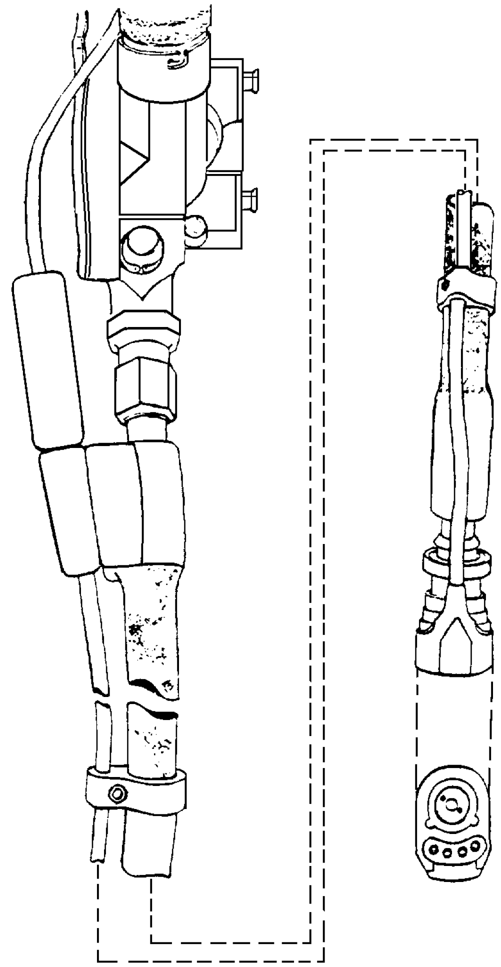


Figure 15-3. Oxygen Regulator Hose Assembly (Typical. Used for OBOGS Only)

15-7. SUBASSEMBLIES OF LOX OXYGEN REGULATOR HOSE ASSEMBLY. LOX Regulator Hose Assembly does not have subassemblies.

15-8. APPLICATION.

15-9. The oxygen hose assemblies that are part of the survival equipment used by aircrewmembers aboard aircraft listed in table 15-1.

15-10. REFERENCE NUMBERS, ITEMS AND SUPPLY DATA.

15-11. Figures 15-6 through 15-8 contain information on each assembly, subassembly and component part of the oxygen hose assemblies. The figure and index number references, part numbers, descriptions and units per assembly are provided in their respective figures.

15-12. FUNCTION.

15-13. During normal flight conditions, the hose assembly supplies the aircrewmember with aviators breathing oxygen and a means of communication to ground and other aircraft/aircrewmembers. Oxygen flows from the aircraft through the seat survival kit hose assembly, seat survival kit to regulator to hose assembly, oxygen regulator, oxygen mask delivery tube, oxygen mask and then to the aircrewmember. When an aircrewmember ejects, the following series of events occur: as the ejection seat travels up the rails, the seat survival kit to console hose is disconnected and the emergency oxygen lanyard actuates the emergency oxygen in the seat survival kit. During the ejection and descent, while in the seat or after separation from the ejection seat the aircrewmember is provided with emergency oxygen until the supply is exhausted. Also in the event of an in-flight emergency the aircrewmember has the capability of actuating the emergency oxygen system in the seat survival kit by pulling the actuation lanyard manually.

NOTE

The service life of an Oxygen Regulator Hose Assembly shall be 5 years from the date placed in service.

Section 15-2. Modifications

15-14. GENERAL.

15-15. There are no modifications to the regulator hose assemblies required/authorized at this time.

Section 15-3. Rigging

15-16. GENERAL.

15-17. Unless operational requirements demand otherwise, rigging of oxygen regulator hose assemblies shall be accomplished at the Organizational Level of maintenance. All rigging shall be performed only by qualified personnel.

15-18. RIGGING PROCEDURES.

15-19. Refer to NAVAIR 13-1-6.7-3 for procedures on rigging the oxygen regulator hose assembly to the regulator.

Section 15-4. Maintenance

15-20. GENERAL.

15-21. This section contains procedural steps for inspection, testing, and repair of oxygen regulator hose assemblies.

15-22. SERIALIZATION.

15-23. All Oxygen Regulator Hose Assemblies have been identified as critical safety items and must be serialized prior to placing in service.

1. Carefully engrave a serial number on the quick disconnect fitting that mates with the quick disconnect of the Seat Survival Kit hose. The serial number shall consist of the AIMD/squadron organizational code followed by a sequential number.

2. Initiate an Aircrew Systems Record (OPNAV 4790/138) on Oxygen Regulator Hose Assembly.

15-24. INSPECTION.

15-25. All oxygen regulator hose assemblies shall be subjected to Place-In-Service, Daily/Preflight, and Special Inspections.

15-26. PLACE-IN-SERVICE INSPECTION. The Place-In-Service inspection is performed on each Oxygen Regulator Hose Assembly prior to issuing to aircrewmember. Perform place-in-service inspection as follows:

NOTE

If oxygen hose fails the inspection refer to table 15-2 for probable causes and remedies.

1. Ensure Oxygen Regulator Hose Assembly has passed functional test.

2. Ensure engraved serial number is present, and legible, on the quick disconnect fitting that mates with the quick disconnect of the Seat Survival Kit hose.

3. Perform Daily/Preflight Inspection in accordance with paragraph 15-27.

15-27. DAILY/PREFLIGHT INSPECTION. The Daily/Preflight inspection is performed daily or prior to each flight by the aircrewmember to whom it is issued. Visually inspect the following:

NOTE

If oxygen hose fails the inspection refer to table 15-2, Troubleshooting for probable causes and remedies.

1. Hose for obvious damage, wear, splits, cuts or frayed fabric.

2. Quick disconnect for damage, corrosion, bent or missing pins, cleanliness and presence of foreign matter.

3. Fitting for damaged threads, rounded hexagon flats and corrosion.

4. Make necessary entries on appropriate form in accordance with OPNAVINST 4790.2 series.

15-28. SPECIAL INSPECTION. Special inspections are required at specified intervals other than Daily/Preflight inspections. The interval for oxygen regulator hoses is 30 days. This inspection consist of a visual inspection and a functional test, both to be performed by the personnel of the Aviators Equipment Branch. To perform the special inspection, proceed as follows:

NOTE

If oxygen hose fails the inspection refer to table 15-2, Troubleshooting for probable causes and remedies.

1. Perform Daily/Preflight Inspection in accordance with paragraph 15-27.

2. Ensure engraved serial number is present, and legible, on the quick disconnect fitting that mates with the quick disconnect of the Seat Survival Kit hose.

WARNING

When working with oxygen, make certain that clothing, tubing fittings, and equipment are free of oil, grease, hydraulic fluid, or any combustible material. Fire or explosion can result when even a slight trace of combustible material comes in contact with oxygen under pressure.

3. Perform Functional Test in accordance with paragraph 15-31.

15-29. TESTING.

15-30. All oxygen regulator hose assemblies shall be subjected to Functional, Continuity Check and Insulation Breakdown, and Bench tests.

15-31. FUNCTIONAL TEST. To perform the Functional Test the oxygen regulator hose assembly as follows:

1. Attach the oxygen regulator hose assembly to be tested, along with a known good oxygen mask and regulator, to a suitable oxygen supply source.

NOTE

There will be a slight resistance during exhalation if a positive pressure oxygen regulator is being utilized for the functional test.

2. Turn on supply source, don mask, and breathe.

3. Perform the electrical Continuity and Insulation Breakdown Test in accordance with paragraph 15-32.

4. Make necessary entries on appropriate form in accordance with OPNAVINST 4790.2 series.

15-32. CONTINUITY CHECK AND INSULATION BREAKDOWN TEST. To perform the continuity check proceed as follows:

NOTE

If oxygen hose fails Continuity and Insulation Breakdown Test, refer to table 15-2, Troubleshooting for probable causes and remedies.

If the TTU-489/E test set is not available refer to paragraph 15-33 to perform the electrical continuity and insulation breakdown test

1. Perform the electrical continuity and insulation breakdown test using the TTU-489/E test set in accordance with the 17-15BC-22 technical manual.

Table 15-2. Troubleshooting

Trouble	Probable Cause	Remedy
Lost or broken Communications	Broken or misaligned pins	Replace communications cord or replace hose assembly (Note 1).
	Open short circuit in Hose wiring	Replace communications cord or replace hose assembly (Note 1).
	Corrosion on pins	Remove corrosion in accordance with NAVAIR 16-1-540.
Torn or split rubberized or material hose	Overstressing of Hose assembly	Replace hose assembly.
Hose assembly leaking	Hole in hose assembly	Replace hose assembly.
	Loose cap, plug, adapter or test stand hose connection.	Tighten as needed.
Notes: 1. LOX regulator hose communication cord cannot be replaced, hose must be discarded.		

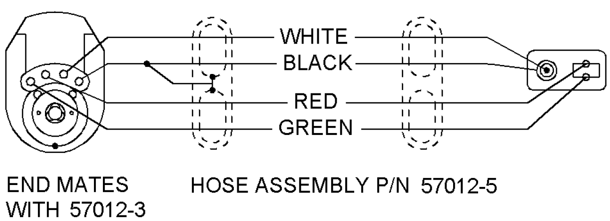


Figure 15-4. Oxygen Regulator Hose Wiring Diagram

2. Make necessary entries on appropriate form in accordance with OPNAVINST 4790.2 series.

15-33. To perform the insulation breakdown and electrical continuity check when the TTU-489/E is not available, see figure 15-4 and proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	500 VDC Megger	—
1	Ohmmeter or Equivalent	—

1. Using a 500 VDC Megger, perform insulation breakdown test. Insulation resistance shall be measured at test potential of 500 ±50 volts dc applied for not less than 0.1 second. Check resistance between any two conductors and hose. Indication shall be 100 megohms or greater.

NOTE

Ensure Rx1 scale is used in performance of electrical continuity check.

2. Using an ohmmeter or its equivalent, perform electrical continuity test by checking continuity of each wire at its respective termination point according to figure 15-4.

15-34. BENCH TEST.

WARNING

Because of possible vacuum pump explosion, only water pumped nitrogen, Type I, Class I, Grade B (Fed Spec BB-N-411) shall be used in testing.

For oxygen test stands and purging equipment, use only nitrogen from any cylinders marked NITROGEN OIL FREE in white letters. Two 3-inch wide bands mark the tops of these cylinders. Do not use 3500 psig nitrogen cylinders used on NAN servicing cart. These cylinders cannot be certified contaminant free.

15-35. The Bench Test shall be performed using an Oxygen System Components Test Stand, Model 1172AS100 or 1316AS100. Refer to the appropriate ground support equipment manual for identification of test stand controls and indicators referred to in the Bench Test procedures that follow. Do not attempt to perform any Bench Test before becoming thoroughly familiar with the test stand.

WARNING

Ensure altitude chamber is configured in accordance with NAVAIR 17-15BC-21, WP003 00, Figure 3, sheets 2 thru 4 as applicable. Ensure High Pressure or Low Pressure H assembly listed in NAVAIR 17-15BC-21, WP003 00 Figure 1 or Figure 2 is attached to N2 Input Connection (18) or Tee connection (28) in altitude chamber as applicable for the item being tested. Remove hose assembly not being used and cap connection (18) or (28) when not in use.

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, oil free, Water pumped, Type I, Class I, Grade B	Fed Spec BB-N-411, NIIN 00-985-7275
As Required	Compound, Leak Detection, Type I	MIL-L-25567

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100
1	Adapter Assembly	REDAR-A10116-2
1	Nipple Adapter	AN919-7D
1	Locknut	TSE01-13
1	Coupling Adapter	AN929-4

NOTE

If oxygen hose fails pressure decay test refer to table 15-2, Troubleshooting for probable causes and remedies.

15-36. PRESSURE DECAY TEST. Figure 15-5 illustrates components of pressure decay adapter assembly. To perform the pressure decay test proceed as follows:

1. Connect adapter assembly (1) onto Oxygen Regulator hose quick disconnect.

2. Install nipple adapter (2) into Oxygen Regulator hose “B” nut (use locknut (3) and coupling adapter (4) for LOX hoses).

3. Connect nipple adapter (2) to N2 INPUT Connection (18).

4. Ensure all test stand valves and regulators are properly secured and turn on N2 supply cylinder.

5. Turn INLET PRESS. ON/OFF valve to on.

6. Using LOW PRESS. REGULATOR (N) slowly adjust inlet pressure to 100 psig as indicated on N2 INPUT PRESS. Gage (27).

7. Turn INLET PRESS. ON/OFF valve to off.

8. Observe N2 INPUT PRESS. Gage (27) for two minutes.

9. Regulator hose shall be leak tight (no indication on N2 INPUT PRESS. Gage (27) of pressure drop).

10. Make necessary entries on appropriate form in accordance with OPNAVINST 4790.2 series.

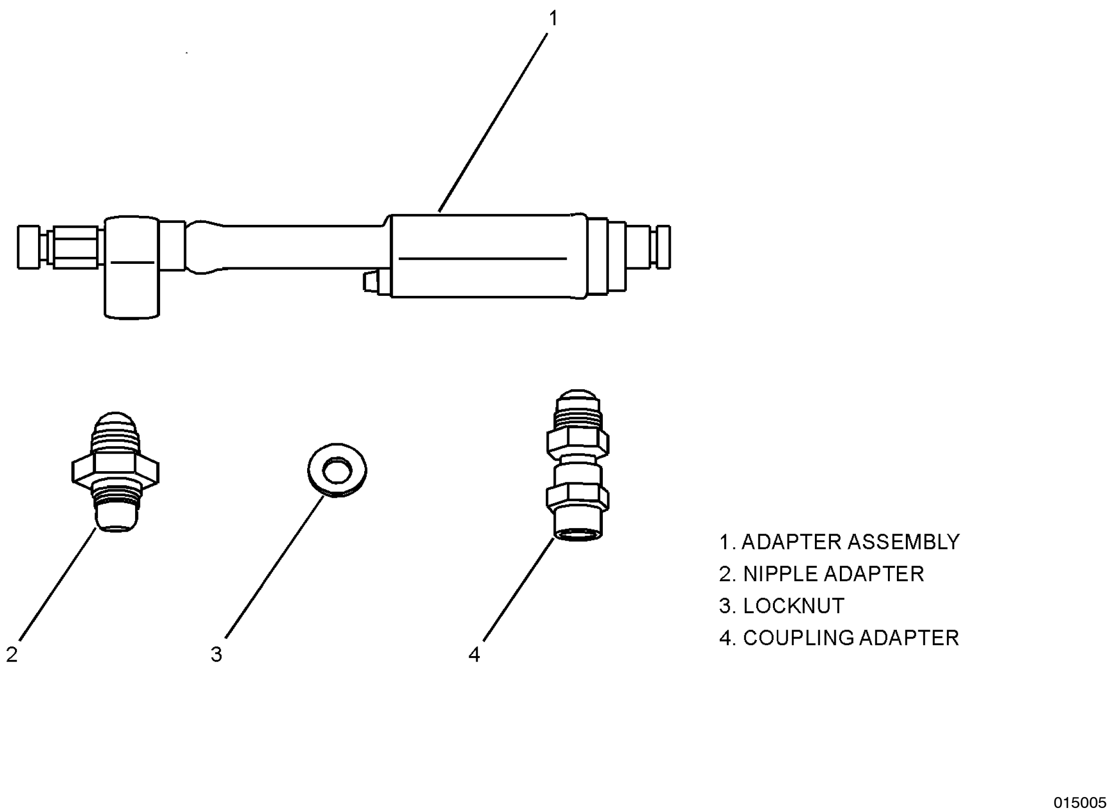


Figure 15-5. Pressure Decay Adapter Assembly

Section 15-5. Illustrated Parts Breakdown

15-37. GENERAL.

15-38. This section lists and illustrates the assemblies and details of all oxygen regulator hose assemblies.

15-39. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

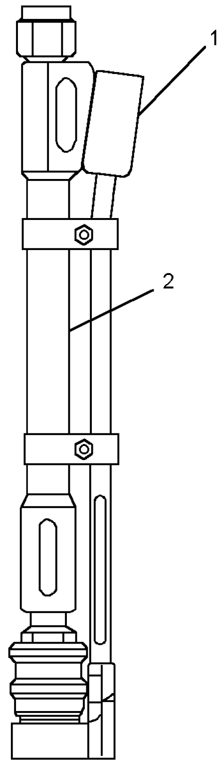


Figure 15-6. Oxygen Regulator Hose Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
15-6	MBEU147722-1	OXYGEN REGULATOR HOSE ASSEMBLY	1	A
	57012-3	OXYGEN REGULATOR HOSE ASSEMBLY	1	B
-1	MBEU148019	. CABLE/KEEPER ASSEMBLY	1	A
	57012-3-1	. CABLE/KEEPER ASSEMBLY	1	B
-2	MBEU148020	. OXYGEN HOSE, SUBASSEMBLY, Regulator ...	1	A
	57012-3-2	. OXYGEN HOSE, SUBASSEMBLY, Regulator ...	1	B

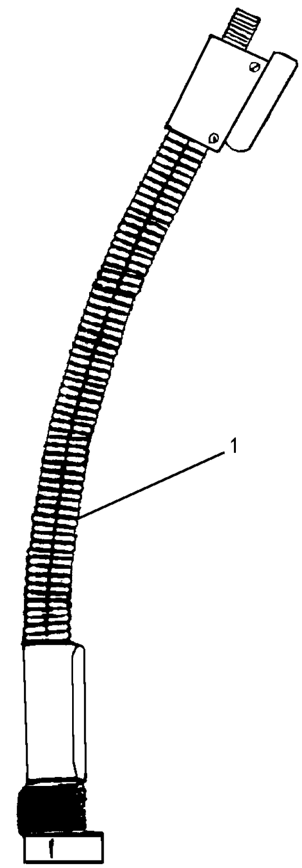


Figure 15-7. Oxygen Regulator Hose Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
15-7	REDAR-A10116-2	OXYGEN REGULATOR HOSE ASSEMBLY	1	

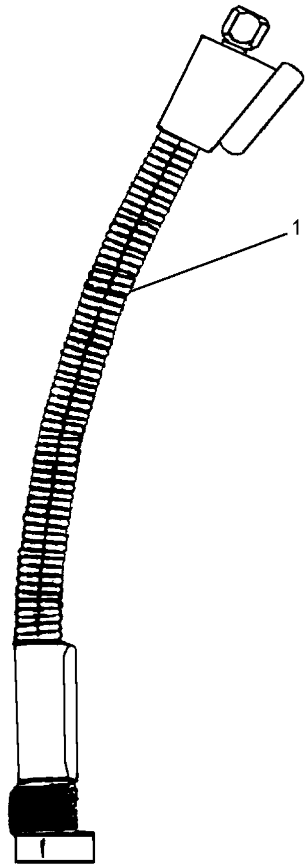


Figure 15-8. Oxygen Regulator Hose Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
15-8	REDAR-A11206-2	OXYGEN REGULATOR HOSE ASSEMBLY	1	

NUMERICAL INDEX

GLOSSARY

ACC. Abbreviation for Air Crew Systems Change.

AIRCREWMEMBER. An aircraft crewmember. Passengers are not considered aircrewmembers.

ANTI-SEIZE TAPE. A tape of any of several thin plastic-film materials (such as tetrafluorethylene) characterized by a waxy, oily texture, and used to prevent binding between mating surfaces of threaded parts when applied to the male threaded portion.

APPROX. Abbreviation for approximately.

ASSEMBLY. A grouping of parts fitted together to form a complete unit.

ATMOSPHERIC PRESSURE. Pressure at sea level, expressed as 14.696 pounds per square inch, absolute, or 29.92 inches mercury column (barometer). See also: PSIA and INHg.

C. Abbreviation for Celsius.

CAUTION. Indicates danger to equipment. The caution precedes the step or item to which it refers.

CDI. Abbreviation for collateral duty inspector.

CCM. Abbreviation for cubic centimeters per minute.

CO_2. Abbreviation for carbon dioxide.

COMBUSTIBLE MATERIAL/SUBSTANCE. Any material or substance capable of burning in the presence of oxygen. See also: EXPLOSIVE MIXTURE, FLAMMABLE MATERIAL.

COML. Abbreviation for commercial. Refers to parts that are commercially available.

COMPONENT. Item of equipment making up part of an assembly or subassembly.

CONFIGURATION. The makeup, size, shape, and relative location of parts of an item of equipment and its accessories. This includes the composition of the materials as well as marking details. The configuration of each equipment is specified by Government drawings, military specifications and modification instructions.

CONVOLUTION. Used in this manual as the protruding side or portion of a diaphragm.

DETAIL PART. See COMPONENT.

DIA. Abbreviation for diameter.

DISPOSITION. Instructions on what is to be done with or to an item.

ELASTOMER. Any of various elastic substances resembling rubber.

ENSURE. To inspect closely, and to test the condition of an item.

EXAMINE. To inspect closely, and to test the condition of an item.

EXPLOSIVE MIXTURE. Any mixture of a combustible material or substance and oxygen capable of violent burning (detonation) either spontaneously or with the external application of heat. See also: COMBUSTIBLE MATERIAL/SUBSTANCE FLAMMABLE Material.

F. Abbreviation for Fahrenheit.

FLAMMABLE MATERIAL. Any material capable of being easily ignited and of burning with extreme rapidity.

FLAP PATTERN. See TEMPLATE.

FLUID. Gas, vapor, or liquid.

FREEZING POINT. Temperature at which a given liquid substance will solidify or freeze upon removal of heat. Freezing point of water is 32°F (0°C).

FULL. (In reference to oxygen cylinders) A full oxygen cylinder is a cylinder which is pressurized to its rated pressure. With respect to a high pressure oxygen cylinder. 1800 psig is considered full.

FUNCTIONAL TEST. A test which puts an item to use to determine if it operates properly.

GAPL. Abbreviation for Group Assembly Parts List. The GAPL, a section of the Illustrated Parts Breakdown, shows how major assemblies are disassembled into assemblies and detail parts.

HEAT EXCHANGER. Apparatus in which heat is exchanged from one fluid to another.

H_2O. Abbreviation for water.

Hg. Abbreviation for mercury.

IN. Abbreviation for inches.

IND. Abbreviation for indicated.

INH_2O. Abbreviation for inches of water column (27.68 inH_2O equals 1.0 PSI equals 2.036 inHg). See Also: inHg.

INHg. Abbreviation for inches of mercury column (0.07349 inHg equals 1.0 inH_2O). See also: inH_2O.

INSPECTION. A close examination for damage, wear and dirt. Also, a regularly scheduled examination of oxygen equipment and accessories.

LBS. Abbreviation for pounds.

LOX. Abbreviation for liquid oxygen.

LPM. Abbreviation for liters per minute.

MANUFACTURER'S CODES. Identification codes for every manufacturer listed as a procurement source in accordance with cataloging handbooks H4/H8, Commercial And Government Entity Codes.

MM. Abbreviation for millimeters.

MOLECULAR SIEVE. A cannister containing a nitrogen-absorbing chemical compound (zeolite) through which air is forced, providing enriched breathing oxygen.

NOC. Abbreviation for Navy Oxygen Cleaner.

NOTE. An informative item. The note may precede or follow the step or item to which it refers.

NUMERICAL INDEX. A part of the Illustrated Parts Breakdown. The numerical index includes all the part numbers listed in the GAPL, arranged in alphabetical-numerical sequence.

OBOGS. Abbreviation for Onboard Oxygen Generating System.

OEAS. Abbreviation for Oxygen Enriched Air System.

PRESSURE. The force exerted by a liquid or gas per unit of area on the walls of a container. See also: PSM, PSIA, and ATMOSPHERIC PRESSURE.

PRESSURE DROP. Loss in pressure, as from one end of a distribution line to the other, due to friction and other factors.

PRESSURE EXPLOSION. Explosion caused by rapid conversion of liquid oxygen to gaseous oxygen in a confined space due to evaporation and warming.

PROPER. Correct or authorized configuration or method.

PSI. Abbreviation for pounds per square inch. See also: PSIA and PSIG.

PSIA. Abbreviation for pounds per square inch, absolute. Absolute pressure is measured from absolute zero (100% vacuum), rather than from normal, or atmospheric pressure. It equals gage pressure plus 14.696 pounds per square inch. See also: PSI, PSIG, and ATMOSPHERIC PRESSURE.

PSIG. Abbreviation for pounds per square inch, gage. Indicates pressure above ambient pressure, as indicated on a pressure gage vented to the atmosphere. See also: PSI and PSIA.

QA. Abbreviation for quality assurance.

QUALIFIED PERSONNEL. Qualified personnel are defined as personnel who have satisfactorily completed a prescribed course at a Navy Training School Fleet Readiness Aviation Maintenance Personnel Training Program (AMP), Inter Service/Factory Training, formal or informal In-Service Training (refer to OPNAVINST 4790.2 Series). In addition, a practical demonstration of the skills acquired in any of the foregoing training situations, to the satisfaction of the Work Center Supervisor/Division Officer is required before the designation "Qualified" can be assigned.

R. Abbreviation for radius.

REFILL. (In reference to oxygen cylinders) To refill is to recharge a cylinder, regardless of the residual pressure remaining within the cylinder.

REPAIRS, MAJOR. Repairs requiring special equipment, personnel, or materials normally not available at intermediate or local levels of maintenance.

REPAIRS, MINOR. Repairs that can be effected at intermediate or local levels of maintenance.

REF. Abbreviation for reference.

SM&R CODES. Abbreviation for source, maintenance, and recoverability codes. Comprised of three parts, a two-position source code, a two-position maintenance code, and a one-position recoverability code. Refer to NAVSUPINST 4423.29 for further details.

SPECIFIC GRAVITY. Density of fluid compared to density of water.

TEMPLATE. A pattern or gage usually in the form of a thin plate of cardboard, wood, or metal. It is used as a guide in the layout or cutting of flat work.

TORQUE. A force, or combination of forces, that tend to produce a rotating or twisting motion. Torque is often expressed pounds-inch (lbs-in.) or pounds-foot (lbs-ft.). A torque wrench is used to apply a measured torque.

TYP. Abbreviation for typical.

WARNING. Indicates danger to personnel. The warning precedes the step or item to which it refers.

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ALPHABETICAL INDEX

ALPHABETICAL INDEX (Cont)

ALPHABETICAL INDEX (Cont)

Subject | Paragraph, Figure, Table Number

D (Cont)

E

F

G

ALPHABETICAL INDEX (Cont)

Subject — Paragraph, Figure, Table Number

H

I

ALPHABETICAL INDEX (Cont)

ALPHABETICAL INDEX (Cont)

Subject | Paragraph, Figure, Table Number

I (Cont)

J

K

L

ALPHABETICAL INDEX (Cont)

ALPHABETICAL INDEX (Cont)

Subject | Paragraph, Figure, Table Number

O (Cont)

P

Q

ALPHABETICAL INDEX (Cont)

ALPHABETICAL INDEX (Cont)

ALPHABETICAL INDEX (Cont)

Subject | Paragraph, Figure, Table Number

T (Cont)

U

ALPHABETICAL INDEX (Cont)

Subject	Paragraph, Figure, Table Number